

ABSTRACT

OF

The Proceedings of the Thirtieth Annual Meeting of the Association of Life Insurance Medical Directors of America

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THE ASSOCIATION OF LIFE INSURANCE
MEDICAL DIRECTORS OF AMERICA

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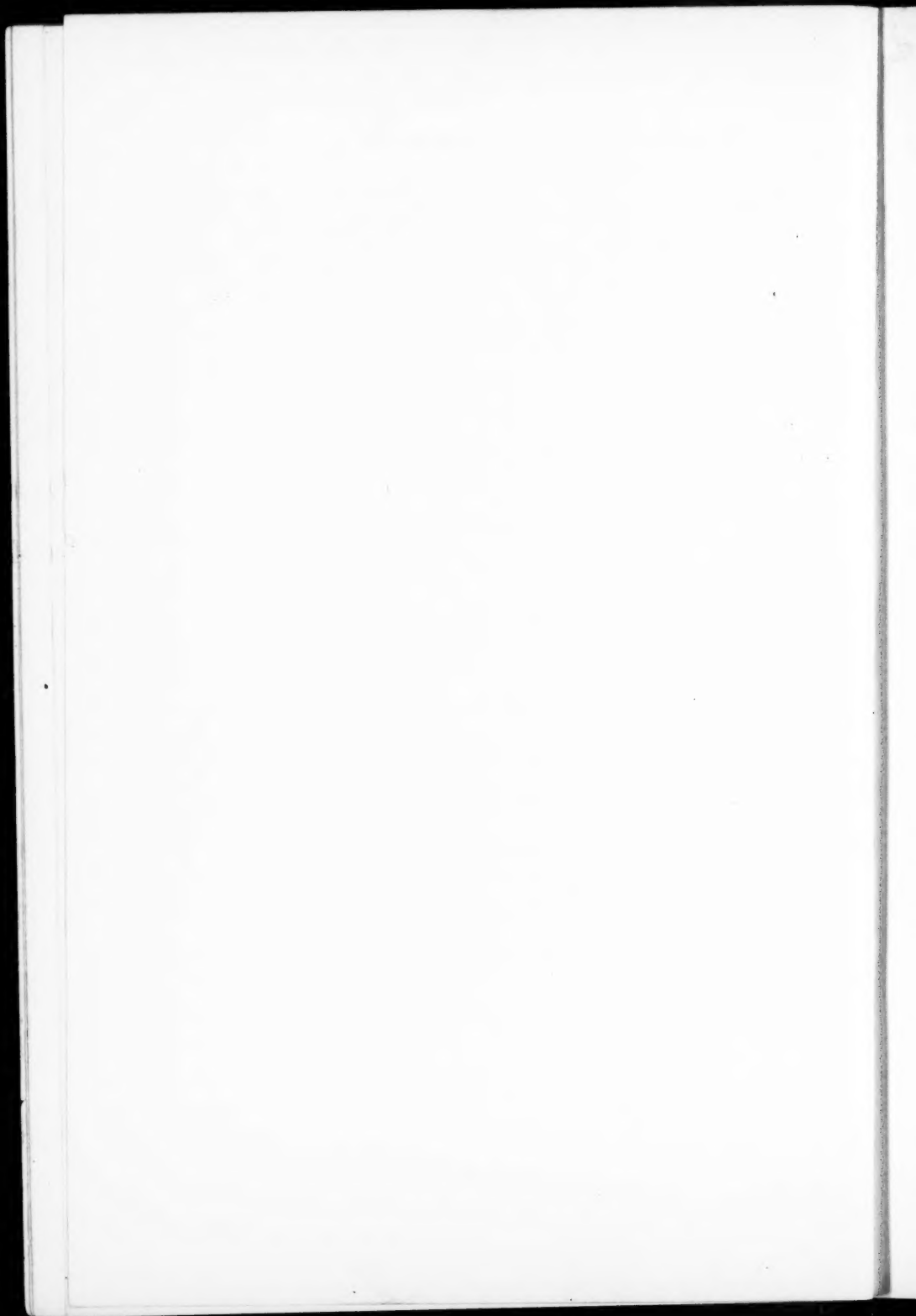
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An Abstract of the Proceedings
OF THE
Association of
Life Insurance Medical Directors
of America

THIRTIETH ANNUAL MEETING

The Thirtieth Annual Meeting of the Association of Life Insurance Medical Directors was held in New York City, on October 22 and 23, 1919.

The first session was held on October 22d, in the Board Room of the Equitable Life Assurance Society, No. 120 Broadway. President Thomas H. Rockwell in the chair.

The second session was held on October 23, 1919, at the Hotel Astor, in conjunction with a meeting of the Actuarial Society of America. President Henry Moir in the chair.

The following members were present at some time during the sessions:

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E. H. Allen, H. B. Anderson, T. D. Archibald, A. W. Balch, W. W. Beckett, A. W. Billing, F. G. Brathwaite, L. D. Chapin, C. L. Christiernin, C. P. Clark, T. C. Craig, R. M. Daley, H. K. Dillard, P. G. Drake, E. W. Dwight, O. M. Eakins, Z. T. Emery, W. G. Exton, C. H. English, J. W. Fisher, R. A. Fraser, Homer Gage, Angus Graham, A. H. Griswold, F. L. Grosvenor, I. Haines, G. C. Hall, J. B. Hall, A. B. Hobbs, J. P. Hutchinson, W. G. Hutchinson, P. H. Ingalls, W. A. Jaquith, A. J. Johnson, M. L. King, A. S. Knight, R. L. Lounsberry, C. B. McCulloch, T. F. McMahon, H. A. Martelle, C. F. Martin, O. F. Maxon, J. C. Medd, William Muhlberg, J. B. Ogden, Herbert Old, J. S. Phelps, J. E. Pollard, J. T. Priestley, W. E. Porter, A. T. Post, T. H. Rockwell, O. H. Rogers, E. K. Root, R. L. Rowley, E. F. Russell, S. B. Scholz, H. H. Schroeder, Morton Snow, G. S. Strathy, Brandreth Symonds, Harry Toulmin, J. P. Turner, G. A. Van Wagenen, W. R. Ward, W. P. Watson, J. H. Webb, W. H. Wehner, F. S. Weisse, F. C. Wells, F. L. Wells, C. D. Wheeler, C. F. S. Whitney, Thomas H. Willard, C. H. Willitts, also Dr. H. H. Chown.

The total attendance at all sessions was seventy-six.

FIRST DAY

Dr. Rockwell—I extend to you the most hearty greetings from the Equitable and from its officers, and I trust that your stay here with us to-day may be pleasurable, as I am sure that it will be profitable.

Election of New Members

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The names of the following candidates for membership, recommended by the Executive Council, were presented:

Dr. Martin I. Olsen, Medical Director, Central Life Assurance Society, Des Moines, Iowa.

Dr. William M. Bradshaw, Medical Inspector, Mutual Life Insurance Company of New York.

Dr. William W. Dinsmore, Assistant Medical Director, Travelers' Insurance Company, Hartford, Conn.

Dr. Charles B. Irwin, Medical Director, North American Life Insurance Company, Hartford, Conn.

Dr. C. N. McCloud, Medical Director, Minnesota Mutual Life Insurance Company, St. Paul, Minn.

Dr. J. T. J. Battle, Co-Medical Director, Jefferson Standard Life Insurance Co., Greensboro, N. C.

Dr. Arthur Geiringer, Assistant Medical Director, Equitable Life Assurance Society, New York, N. Y.

Dr. R. J. Kissock, Assistant Medical Director, Metropolitan Life Insurance Company, New York, N. Y.

Dr. A. O. Jimenis, Medical Supervisor, Metropolitan Life Insurance Company, New York, N. Y.

Motion was made and carried that the Secretary be instructed to cast a ballot for each of the candidates named. Ballots were cast as ordered and candidates declared elected to membership in the Association.

Of the newly elected members, Drs. Olsen, Bradshaw, Dinsmore, Irwin, McCloud, Geiringer, and Kissock were present, and were introduced to the members by a committee appointed by the President, composed of Drs. Porter, Post, and Christiernin.

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Motion was made and carried that the reading of the minutes of the last meeting of the Association be dispensed with.

The Secretary read the minutes of the meetings of the Executive Council of June 11, 1919 and October 21, 1919. On motion these minutes were approved as read.

President T. H. Rockwell then delivered the following address:

ADDRESS BY THE PRESIDENT, DR. ROCKWELL

This is the thirtieth anniversary of the Association of Life Insurance Medical Directors, beginning with a membership of 27 Companies and 34 members. We are to-day an organization of 55 Companies, and 153 members.

A review of the papers submitted in earlier years clearly indicates the empirical selection of risks, leaving much to the individual opinion of the Medical Director, who decided upon their acceptance or rejection by rule of thumb, or by what he liked best to call "common sense." We cannot even yet discard the human element in selection, or the astute guess which, as a prerogative, is still permitted to the Medical Director. On the other hand, we cannot deny what progress has been made along scientific and more exact lines, which a quarter of a century ago would almost have been considered impossible. While we do not all of us possess some mysterious sense of medical selection, our personal impressions cannot be entirely overcome, even by accurate results extending over years, when computed by our clever actuaries.

Dr. Lambert once said to me: "It does not take a very bright Medical Director to find a flaw in a case, provided he is looking for one." In glancing over the program for this meeting, and for the combined meeting to-morrow with the Actuarial Society, I am impressed with the very scientific

angle the papers have assumed. This is as it should be. The progressive Medical Director cannot serve his Company well unless he works in harmony with the Actuary. He should endeavor to learn certain rudiments of actuarial science to enable him to at least partially understand certain fundamental and underlying principles which govern the accurate rating of risks. He should get away from dwelling too much on the individual case before him, and his chief aim should be to properly classify the application and put it with others where it belongs.

We should not let our personal impressions altogether override us in making our selections. Let us instead study results; results of our own and other companies, and endeavor to be more exact in our methods and in the study of the vast material open to us all. It matters little what you or I may think about a certain impairment if we can scientifically prove what the results have been by accepting say, a thousand similar lives.

There is no scientific reason which would prevent almost any applicant from having a policy at some price. It is thoroughly possible to insure almost any individual on some plan and rate of premium, provided we can strike an average. There is perhaps little reason why almost any company should restrict itself to so-called "standard" lines and insure only the cream of the business. There is some nourishment in skim milk, and proper provision may be made for the reclamation of a considerable portion of what would otherwise be thrown out and declined. Sub-standard business can be made profitable, if an adequate and proper charge be made to take care of the extra hazard. But if a Company announces that "We take only standard risks," and yet does accept some with real impairments at regular rates, even if limited to the "Endowment" plan, it would seem that it may not be transacting its business on a really scientific basis.

It is to be hoped that eventually an individual who applies to several companies at the same time will receive practically the same treatment from each.

My plea to-day is, representing as we do the important companies of the United States and Canada, to endeavor with the help of our Actuaries, to rapidly and efficiently place ourselves on a modern, scientific, and progressive basis, to study deeply the problems daily presented, and to endeavor to harmonize and standardize the medical selection of the risks presented.

Dr. Rockwell—Gentlemen: In addition to the many duties of an executive nature which our Vice-President has to perform, he also has a supervision over the bodies which are charged with the selection of Equitable risks. Naturally therefore he is very much interested in meetings of this kind, and meetings with the Actuarial Society, which we will have to-morrow, and it gives me therefore great pleasure to introduce to you our Vice-President, Mr. J. V. E. Westfall.

Mr. Westfall—Gentlemen, owing to a business trip which President Day is obliged to take out of town, he is unable to be present this morning, and he wanted me to express his regrets. He was very much disappointed and would have been delighted to be with you.

I do not want to interrupt the proceedings of this meeting because I know that you all have very important matters to consider and it is not my intention to make any talk, but I want to tell you how glad we are to have you here, and I want to refer to just one thought. As I came in, I happened to overhear a part of Dr. Rockwell's remarks, and I heard the words, "substandard business." I do not know just what he said about substandard business, but I should like to leave this thought with you. During the last year there has been a tremendous increase in the new business. Several influences have brought this about. The most prominent, and the influence which gave it its greatest impetus, was of course the

epidemic, because in nearly all cases I think the business of the various companies jumped at about the time of the epidemic. I know that it was the case with the Equitable and with the New York Life, so that I think the most potent influence was the epidemic. There have been other influences, however, which brought about this increase in the demand for new business. The war, for example,—government insurance, the increase in inheritance taxes has been responsible for millions of insurance. Take the unrest existing now between capital and labor, and which has been the cause for a demand for group insurance and social insurance, so that to-day it is easier to sell insurance than it ever has been before in its history. You take any responsible person—life insurance is a part of his financial program. The agent does not have to create the demand for insurance, the same as he did formerly. I do not mean to suggest by that remark that it is possible to do business without the agent. The agent has his part and always will have his part in life insurance, but he does not have to create the demand. He acts in the capacity of an adviser, more than he used to a few years ago. Now unfortunately, all of these people who want life insurance are not perfect risks. There is a demand for life insurance among all classes, and it seems to me that one of the problems that life insurance companies have to face at the present moment is, to be able to furnish or to supply this demand for life insurance, that is, to furnish insurance to those who are not gilt-edged risks, but who have physical impairments. They certainly need insurance as much as other people do, and if insurance can be furnished them, the life insurance companies ought certainly to find some way to furnish that insurance to a much greater extent than they are at the present time. Of course the growth of this substandard insurance will have to be necessarily slow, but it is one of the problems which life insurance companies have to-day, and if they do not meet it, some way will be found to furnish these people with life insurance, and that ought to be recognized. It is a problem which is particularly important to us as Medical Directors and as Actuaries. I am sorry I did not hear Dr.

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Rockwell's paper. I do not know just what he said. I have not had an opportunity of seeing it, but I simply know and wish to emphasize how strongly I for one feel about sub-standard insurance. It is a real demand among other lines of insurance, and it ought to be recognized by the companies. That is the only thought I wish to leave with you. I want to thank you again for the opportunity I have had for meeting you, and to express again President Day's regrets at not being able to be here.

Balloting for nomination of officers was next in order. The President appointed Drs. Scholz and Whitney as tellers, and they distributed the ballots.

Motion was made and carried that the By-Laws be waived so as to enable the Association to proceed with the election of officers on the afternoon of the first day, instead of on the morning of the second day.

The Treasurer's Report was read by Dr. C. L. Christiernin and after being duly audited by the Auditing Committee, Drs. Rowley and Wehner, was accepted and placed on file.

Dr. Rogers read the report of the Special Committee in charge of the M. I. B., which was accepted and placed on file.

Dr. Rockwell—It is with deep regret that I announce the death of that delightful, genial, and competent man, Dr. Frank Wells, Medical Director of the John Hancock Mutual Life Insurance Company, one of the charter members of this Association. His demise leaves only three living founders. May they long be spared to us! Dr. E. H. Allen will read a memorial prepared by Dr. Edward B. Kellogg on the death of Dr. Wells:

Dr. Allen then read the following memorial:

To the Association of Life Insurance Medical Directors:

It is with sadness that I announce the death of Dr. Frank Wells at his residence in Boston, Massachusetts, March 4, 1919, in the seventy-seventh year of his age. His final illness was brief, about ten days' duration.

He was born in Boston, Massachusetts, October 11, 1842. He attended the public schools of Boston and entered Harvard University in 1860. In his junior year, 1862, he enlisted in the Forty-fifth Massachusetts, serving until September, 1863, when he resumed his college work and graduated in 1864. He then served upon the staff of General Lockwood. After the war he entered the Harvard Medical School and received his degree in 1868. He continued his medical studies in Vienna, Paris, and London, specializing in obstetrics and gynecology. After returning to America, he commenced practice in Andover, Massachusetts, but soon removed to Cleveland, Ohio, where for ten years he was our Medical Examiner. He was Professor of Obstetrics in the Cleveland Medical School and visiting surgeon to the Cleveland City Hospital. He was also Health Officer of Cleveland.

Dr. Wells returned to Boston, Massachusetts, in 1878 and soon established a practice in Brookline. For many years he edited the Registration Reports of Massachusetts. He was appointed Medical Director of the John Hancock Mutual Life Insurance Company in 1882, which position he held until his death, a term of thirty-seven years, covering a period of service longer than that of any other officer of the Company.

Dr. Wells was one of the organizers of the Association of Life Insurance Medical Directors. He served as Secretary from 1889 to 1891. From 1891 to 1894 he was its President. From 1894 to 1895 he was a member of the Executive Council. From this date to the time of his death, his interest in the Association remained unabated.

Other positions of honor and trust were: Vice-President of the Massachusetts Infants' Asylum; Vice-President of the

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Massachusetts Emergency and Hygiene Association; Executive Committee of the Boston Provident Association and Chairman of the School Committee of Brookline.

While engaged in the practice of medicine Dr. Wells found time for literary work which he greatly enjoyed. His book, *Filth in Relation to Disease*, and a volume of lectures on *School Hygiene* reached a wide circulation. The lectures were delivered before the teachers of the Boston schools.

Dr. Wells possessed a high sense of honor and fidelity to his Company. He was ever gentlemanly, courteous, kind, and helpful to his associates and friends. His duties were often arduous and exacting; but he performed them cheerfully and thoroughly.

While in Paris, in 1870, he married Miss Gertrude Huidekoper of Meadville, Pennsylvania. Mrs. Wells, two sons, and a daughter survive him.

I suggest the adoption of the following resolutions:

RESOLVED: That in the death of Dr. Wells, the Association has lost one of its valued organizers and the John Hancock Mutual Life Insurance Company a faithful officer.

RESOLVED: That we tender our condolence and sympathy to his family and also to the Company he served so long and faithfully.

The memorial was adopted by a rising vote.

The tellers posted the results of the balloting for nomination of officers, and distributed the ballots for the election of officers.

On motion, the following proposed amendment to the By-Laws was carried:

Hereafter Article V of the By-Laws shall read as follows:

At least thirty days before the date of the Annual Meeting, the Executive Council shall appoint six members of the Asso-

Amendment to the By-Laws

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ciation to serve as a Nominating Committee to nominate candidates for election by the members as officers and as members of the Executive Council. The Nominating Committee shall prepare a list of nominees, one candidate for each office to be filled, and shall report to the President prior to twelve o'clock noon of the first day of the Annual Meeting. If the Nominating Committee fails to report, nominations by the members present shall be in order.

The President shall announce to the meeting the names of the candidates so nominated and the respective offices, and shall call for further nominations by the members present. If no further nominations be made, a motion that the nominations be closed shall be in order which, if duly seconded and adopted by a majority of the members present and constituting a quorum, shall authorize the President to declare the nominations closed and direct the Secretary to cast a ballot at the election on the morning of the second day of the Annual Meeting, for the officers and members of the Executive Council so nominated.

If additional nominations are made by the members present, and duly seconded, the President upon the adoption of a motion to close the nominations, shall announce to the meeting and cause to be posted at the place of meeting a list of all the candidates and the respective offices, both those nominated by the Nominating Committee and by the members as aforesaid. If anyone has been nominated for more than one office, he shall be deemed to have been nominated for the office for which he chooses to run, and shall then announce his selection. Each member present shall then receive from the Secretary a blank ballot, on which there shall be a space for each office to be voted for, and shall record upon the blank his preference for each office, one name only for each office, and to be selected only from the aforesaid list. On the morning of the second day of the Annual Meeting the election of officers and members of the Executive Council shall take place. The President shall appoint two tellers who shall receive and count the ballots prepared by the members, as aforesaid, and presented by them,

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or the ballot cast by the Secretary, should no nominations by members have been made, and shall announce the results of the election to the meeting.

Dr. Rockwell—This concludes the general business, and we will now proceed to the discussion of papers. The first paper to be discussed is that presented by Dr. William Muhlberg on "Conservation Work Based on Annual Urinalysis and Policy Holder's Statement of Health."

CONSERVATION WORK BASED ON ANNUAL URINALYSIS AND POLICY-HOLDERS' STATEMENTS OF HEALTH

BY WILLIAM MUHLBERG, M.D.

Medical Director, Union Central Life Insurance Company

It may, I believe, be safely postulated that, while the mortality tables used by Insurance companies fairly predict the death rate that is to be expected among policyholders, it by no means follows that the actual mortality experience can not be markedly influenced, not only by careful medical selection of insurance risks, but also by efforts to prolong the lives of those selected.

There is a notable discrepancy between the Medico-Actuarial and the American Experience Table. It would, however, be illogical to assume that the improvement of the death rate shown by the Medico-Actuarial Table is entirely due to a more careful selection. As a matter of fact, it is significant that the Medico-Actuarial Table, compared with the American Experience Table, shows relatively the greatest improvement in mortality at the younger ages and practically very little at ages past fifty, despite the fact that medical selection has as a rule been more severe at the older ages.

The commonest causes of death among men at the younger ages are tuberculosis, typhoid, accidents, appendicitis, heart and kidney troubles. There has been a gradual, but distinct, improvement in the death rate on account of tuberculosis and typhoid within the past twenty years, as shown by the Census Bureau Statistics, and this improvement is necessarily reflected in the Medico-Actuarial Table, in contrast with tables constructed at earlier periods.

Personally, I believe that general health conditions, rather than medical selection, are to be given the major credit for the lower mortality rating of the Medico-Actuarial Table. If this is true, it certainly behooves insurance companies to encourage every effort conducive to improving public health in general and of their policyholders in particular.

There are four ways in which this may practically be done:

- (1) By legislative action.
- (2) By education and propaganda.
- (3) By direct examination of and advice to the policyholder.
- (4) Establishment of sanatoria for the treatment of policyholders.

Legislative action—and under this term should be included federal, state, and municipal laws and regulations governing health—is particularly effective with reference to typhoid, malaria, infectious or contagious diseases, food or occupational poisonings. The results achieved are often brilliant. Wherever the method can be effectively applied, the results will always be more satisfactory than those developed through propaganda, education or direct appeal, for the reason that the beneficiary plays but a passive rôle in the work.

I may illustrate this best by the experience in Cincinnati with reference to typhoid fever. For years, on account of a poor water supply, there were serious outbreaks of typhoid every autumn. The health authorities, the doctors, and the newspapers waged an active campaign of education against the dangers of the use of unboiled water, contaminated milk and food, etc., but the results were almost negligible. Where-

upon, the city did the sensible thing—constructed a modern waterworks with proper filtration plant, and typhoid, except for imported cases, has ceased to exist.

In other words, it is extremely difficult to interest the people in public health campaigns, their attitude towards the subject being similar to that towards adequate life insurance protection; they are more willing to rely on luck than to extend any active personal coöperation.

But this attitude should not discourage us in our efforts, Phthisiologists are by no means agreed why tuberculosis is on the wane. There are, no doubt, many contributing factors: improved therapy, evolutionary immunity, earlier diagnosis, clearer conception of the pathology of the disease, better housing conditions and food. But I believe that some credit, too, should be given the Anti-Tuberculosis Societies, newspapers, etc., for their campaign of education.

The commonest causes of death, arranged approximately in their order of frequency, on account of which the Company I represent was called upon to pay claims in 1917 are: heart disease, apoplexy, tuberculosis, Bright's disease, pneumonia, cancer, accidents, suicide, appendicitis, paralysis, disease of liver, angina pectoris, typhoid, arteriosclerosis, diabetes, malaria. It will be noted that only a few of these conditions—tuberculosis, accidents, typhoid, and malaria—can be effectively combated through legislative methods. Our recent experience with influenza (and the same is probably true for pneumonia) has demonstrated how ineffective methods based on our present knowledge really are with reference to this epidemic.

Other diseases, notably those of the degenerative type: cardiorenal conditions, apoplexy, brain diseases, high blood pressure, and diabetes, cannot be readily guarded against. Their etiology is vague, numerous factors entering into the causation—syphilis, alcohol, hard work, mental strain, local septic infections, intestinal intoxication, poisons, gout, heredity, etc. Some of these, as syphilis and alcohol and occupational poisons, can be influenced through legislative action

and health laws; others, as mental strain, hard work, intestinal intoxication, might be reached through education and propaganda; and still others, the local infections, might be reached by direct examination.

In all of these conditions, and this includes cancer, an early diagnosis will materially increase the life expectancy. But even an early diagnosis is useless unless the patient will patiently and intelligently carry our measures for holding his ailment in abeyance. We have found from experience that not all persons suffering from diabetes, Bright's disease, and high blood pressure have the will-power or evince sufficient interest to carry out the somewhat onerous therapeutic measures called for by their ailments.

How can insurance companies throw the weight of their influence and use the advantage of their position in bringing about an amelioration in health conditions?

In the first place, I believe the Medical Directors should take a more active part in the various endeavors to bring about an effective Federal and State Health Administration. Such a move need not originate from the Medical Directors' Association itself, but the executive officers of the various insurance companies represented will, I believe, extend such assistance—financial and moral—to any propaganda of unquestioned merit, provided the Medical Director takes the initiative in recommending such support. Some of the industrial insurance companies have, I am sure, done very valuable work through the widespread distribution of literature dealing with tuberculosis, malaria, hookworm, diet, infant feeding, etc.

Furthermore, it would be distinctly advantageous if we could agree on some conventional plan for the examination of our policyholders.

The Company I represent has been doing so-called "Health Test Work" among its policyholders for the past five years. We have developed a plan that unquestionably yields satisfactory results from every standpoint—humanitarian, financial and business. But the plan is open to the criticism that

it may not be sufficiently extensive and that it is not working in harmony with other companies that are similarly engaged in this work. I shall, therefore, present in detail the method we employ, not because it is ideal or complete or entirely satisfactory, but rather that I may learn through the discussion and suggestion of the members of this Association, wherein it may be improved. I have received within the past year, letters from several companies interested in Health Test Work, asking for a description of the plan pursued by the Company I represent. This would indicate that a general interest has been aroused in the matter and that some of the companies have not yet decided on the mode of procedure they intend to adopt.

The Company I represent has taken no very active part with reference to pending or contemplated legislation, although personally I would be very much in favor of the Company's using its influence whenever any really constructive legislation is submitted to Congress or in the State Legislatures.

In an educative way, we send to every applicant to whom a policy is issued, a little booklet entitled *Long Life*, which is designed to teach him in a popular way the more important hygienic laws. Particular stress is laid in this booklet on such impairments as are likely to be discovered as a result of the examination—overweight, underweight, blood pressure, traces of albumin or sugar-casts, renal colic, indigestion, etc. The dangers of the commoner diseases, such as heart disease, tuberculosis, Bright's disease, cancer, are treated quite extensively. The measures recommended are along purely hygienic or dietetic lines. The policyholder is warned against self-medication and urged to consult a physician when certain premonitory symptoms of moment present themselves.

A similar booklet is sent to our applicants declined on account of lung, kidney, heart or blood-pressure conditions, build, or poor family history.

In spite of the fact that these booklets do savor a bit of patent medicine almanac literature, I really believe that they

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are of value. Many of our policyholders request additional copies for distribution among employees, relatives, and friends.

Our conservation work among policyholders is limited to a free urinalysis annually, together with advice based on a statement of health that the policyholder submits with the sample. The service is extended irrespective of amount of insurance, age, or plan.

The method of procedure is as follows: There is sent annually to every policyholder a postal card, setting forth the advisability of having a careful urinalysis made. He is invited to return the postal to the company, on receipt of which a container and urine vial and a blank health slip are sent him, giving full instructions for mailing the sample. The policyholder pays the postage, which is twelve cents.

On receipt of the sample, a careful chemical and microscopical examination is made and the policyholder is advised of the findings. Suggestions are made with reference to any abnormal chemical or microscopic findings, and in addition, advice is given when it appears from his answers on the health slip that he is suffering from any condition or disease that can be diagnosed from the statement he makes. Where we suspect that he has tuberculosis, he is further urged to submit a sample of his sputum for tuberculosis examination; or where we suspect hookworm, he is asked to send us some of the feces.

The commoner impairments discovered by the urinalysis are albumin, sugar, casts, blood, pus; from the statement of health, overweight, underweight, indigestion, lumbago, chronic rheumatism, chronic cough, tuberculosis, asthma, renal colic, gallstones, headaches, etc.

There is sent to the policyholder, on giving him our opinion of his case, a booklet entitled, *Suggestions to Policyholders*. This treat of very much the same matter discussed in the *Long Life* pamphlet.

The actual results achieved by this plan have been very encouraging. About 12% of our policyholders respond annu-

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ally. The impairments discovered are of interest, as indicated by the following percentages:

Normal.....	48.1%
Albumin, casts, pus, and blood	14.6%
Sugar.....	1.7%
Overweight.....	3.6%
Underweight.....	1.5%
Tuberculosis.....	.5%
Miscellaneous including for the most part conditions such as gallstones, kidney colic, indigestion, lum- bago, irritable bladder, neurasthenia, headaches, etc.....	30.0%

The age distribution is as follows:

Ages 39 or less.....	41.6%
" 40 to 49.....	33.6%
" 50 and over.....	24.8%

The age distribution of all policyholders of the Company, by attained ages is:

Attained ages 39 or less.....	49.1%
" " 40 to 49.....	29.8%
" " 50 and over.....	21.1%

A comparison of these percentages shows that the older policyholders respond in slightly greater percentages than the younger ones.

We have frequently noticed that policyholders who know that they are not in good health will respond, and this is particularly true for those who have Bright's disease and diabetes. This, no doubt, accounts for the rather high percentage of albumin, cast, and sugar findings. While, of course, it is desirable that the impaired class of policyholders respond, the fact that they do so makes any statistics based on the mortality findings among those who submit to the Health Test service very difficult of interpretation. I am keeping a careful record of our work and I hope some of these days to submit a Medico-Actuarial study, based on our findings; but I am quite sure that our mortality experience among these policyholders will be distinctly higher than the average for the Company, on account of the element of self-selection.

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But for this very reason, this work will unquestionably give the companies valuable data in the future for the investigation of impairments, about which at present we know very little, on account of the fact that such risks have been declined. This includes the commoner urinary abnormalities, tubercular lesions, gastric ulcer, goitre, etc.

It is my opinion that from every viewpoint—humanitarian, business, scientific, and financial—conservation work, when done along limited lines as we are doing it, is of great benefit to insurance companies. It is true, I have no statistics to support this statement, but this is, nevertheless, my firm conviction. The humanitarian aspects of conservation are so beautifully and ably presented in the paper read by Dr. F. C. Wells before the Society in 1915, that I need not discuss this phase of the subject.

From the business viewpoint, our policyholders, with few exceptions, are very grateful. The work advertises not only the Company that is doing it, but it also promotes the feeling of mutuality between the policyholders and insurance companies in general. Scientifically, no physician will question the importance of an early diagnosis of such diseases as tuberculosis, Bright's, diabetes, etc., and we have caught many of these in their incipency.

Financially, I believe, it is profitable. For every year that we can prolong the life of one of our policyholders, the Company saves about \$270. This is on the assumption that the average policyholder carries about \$3000; the interest rate and one more premium on this, for one year on account of the prolongation of life, amounts to about nine per cent. on \$3000. There has been a decrease in our mortality in the past few years among our older policyholders, as shown by a more favorable death rate in our non-participating business, which the Company discontinued writing about twelve years ago. This improvement, I believe, is partly due to the Health Test work. Just how far insurance companies can go in expending their funds for conservation work and reap a financial gain, and just how far we may venture without losing

sight of the fact that we represent insurance companies and not public health institutions, is another consideration. One can conceive how enormous sums might be spent in this way, without proportionate financial returns to the Company and with considerable objections on the part of Insurance Commissioners, who could rightly maintain that insurance funds should be expended for satisfying the terms of policy contracts, rather than for propaganda purposes. The expenditure of money for conservation work will, in my opinion, yield very satisfactory results up to a certain point; but when done too lavishly, especially for supplying free nurses and free hospital treatment, it may reach a figure to which insurance commissioners could logically object.

It was partly this consideration and partly because the whole matter was in an evolutionary stage that impelled the Company I represent to attempt this work primarily in a limited and conservative way.

Our net death losses are, in normal years, about \$3,000,000. We have about 200,000 policyholders on our books. In event that every one of these policyholders submitted to a full examination annually, it would cost about \$800,000 to \$1,000,000, on the assumption that the physician was paid \$4.00 to \$5.00 for his examination.

It must be remembered that many of our claims are due to diseases and injuries that could not be prevented or averted by an annual examination. These so-called accidental conditions are pneumonia, pure accidents, typhoid, appendicitis, suicide, septicemia, malaria, influenza, cancers of the internal organs, etc. These constitute at least 33% of our losses. Accordingly, about \$2,000,000 of our annual net losses are due to diseases that might be favorably influenced by a yearly examination and, as stated, this annual inspection would cost almost \$1,000,000. I doubt very much whether it would be possible to cut down the death claims among these risks one half, in order to reimburse the Company for its expenditure, especially since there are two factors that companies must not neglect to take into account: (1) A policyholder

who learns through a Health Test examination that he is impaired will be less likely to lapse his policy; (2) A policyholder rated as a substandard risk will select against his substandard policy if the examination is favorable.

Of course, I appreciate that all policyholders cannot be made to respond and that as a rule, those who are doubtful of their health, and therefore most likely to be benefited, will avail themselves of the service. But discounting even this consideration, I question whether, financially, an annual full examination, costing \$4.00 or \$5.00 really pays.

On the other hand, the work we are doing costs only about 50 cents per policyholder. The impairments that we discover are, I should conservatively guess, about one half those developed through a full examination. To compensate for this, however, I believe that at least twice as many policyholders will submit samples and statements of health, as will respond to the annoyance and trouble of a full examination. If this assertion is true, we secure practically the same financial gains at about one fourth or one fifth the cost. I do not wish to go on record as opposing a full free annual examination by a competent physician—quite the contrary. I believe it would be the ideal method, were it not for the cost.

The expense of a full examination may in a measure be compensated for by extending this privilege only to the larger policyholders. We have in contemplation the plan of offering an annual complete free examination to policyholders who carry \$25,000 or over; those insured for \$10,000 to \$25,000 will be encouraged to undergo an examination every two or three years—and for amounts less than \$10,000 the offer will be made every five years.

In addition, it is often advisable, where the urinalysis or the statements made by the policyholder are unfavorable, to urge even the small policyholder to submit to a full free examination at once. In individual cases, examinations by specialists are desirable—these apply particularly where blood examinations, Wassermann Tests, eye or ear examination, or X-ray pictures are indicated.

Conservation work, to be successful, must be conducted with tact and foresight. The policyholder is suspicious, the agent is not entirely convinced of its value, and unfortunately, the general practitioner who treats the policyholder often resents what appears to him an unwarranted intrusion into his province. The general practitioner, too, it must be confessed, is more skillful in handling diseases with manifest symptoms, as tonsillitis, pneumonia, etc., than in caring for such conditions as high blood pressure, traces of albumin and sugar, casts, overweight, heart murmurs, etc. As a matter of fact, most of our difficulties arise in connection with cases where small quantities of albumin or of sugar or numerous casts are found. Among these policyholders, we call for additional samples for recheck. But only too frequently, where we are convinced of the existence of such findings, the family physician makes a hurried, careless examination and dismisses his patient with comments not entirely complimentary to the motives of the Insurance Company.

Personally, I feel the best results, with least financial outlay, will be obtained when all of the companies of this Association combine to do their conservation work on a coöperative and harmonious basis. If the work is of value, it is not fair that only a few of the companies practice it, because a policyholder will usually carry insurance in more than one Company. I am inclined to believe a common bureau could be established, for all companies, with expenses divided pro rata—perhaps the Life Extension Institute might be called upon to do the work.

Our experience so far demonstrates that the work must be carefully conducted and that it must not drift far from the supervision and control of the companies, because after all, it is the element of personal touch that overcomes most difficulties and obstacles raised by policyholder, agent, and practicing physician.

DISCUSSION

Dr. Willard—I had forgotten that the paper was not to be read, and thought that the points made by Dr. Muhlberg,

being fresh in your minds, I could make reference to them in the course of a few remarks in general approval of the idea and a statement of some of the things that our Company is doing along this line.

I think the majority of you are rather familiar with the welfare work which is being done by the Metropolitan for policyholders and for employees, both in the Home Office and in the field, and the work that I am now referring to has to do exclusively with the policyholders in what we call our Ordinary Department, as distinguished from the Industrial.

We have no statistics whereby we will be able to convince you that we have saved lives, that we have lengthened lives. We only know that it must be so, in view of the volume of work that we are doing.

We give to every policyholder in the Ordinary Department the privilege of periodical complete physical examination. Each one receives a circular, setting forth the eligibility and conditions of the privilege, which reads as follows:

If insured in the Metropolitan for \$1000 and less than \$2000, you are eligible for first examination after your insurance has been in force for four years, and every fourth year thereafter. If insured for \$2000 and less than \$3000, you are eligible for first examination after your insurance has been in force for three years, and every third year thereafter. If insured for \$3000 you are eligible for first examination after your insurance has been in force for two years, and every second year thereafter. If insured for over \$3000, you are eligible for first examination after your insurance has been in force one year, and annually thereafter.

Since the institution of that privilege, there have been in round numbers, 61,000 applications from policyholders for the privilege of examination. Of those 61,000 permits for examination, only 38,500 have been availed of by the holders of them; but 61,000 does not represent all of the policyholders who are privileged to have this examination. A very large number, possibly 90%, of those who are entitled to it have made no response whatever. But of the 61,000 who made the request

for the examination, and started to do things, 34,000 went through with it and had complete examinations. Three thousand had a physical examination only, 1500 had a urinary examination only, and 20,500 of them did not pursue the subject any further. They did not put themselves in connection with the Life Extension Institute. The remainder, 2000, were in course of action.

And I may say that this service which we give policyholders is the privilege of examination by physicians of the Life Extension Institute. The results of the examination are communicated to the policyholder through the Life Extension Institute. We get letters from appreciative and enthusiastic policyholders. They range from bank presidents down to men in very humble occupations, and express their gratitude. Many of them have told of the finding of conditions which they might set about to remedy, and in many cases have already remedied.

As I have said we have no elaborate data to absolutely prove that good has been accomplished, that lives have been prolonged, or that lives have been saved. We have good reason to believe, though, that lives have been saved, and that the length of lives has been prolonged. We do not feel quite sure that we can justify it solely as a purely business proposition, unless we gave more definite and specific instances where the results we hope for have been secured. But it is so interwoven with the remainder of the welfare work which our Company has done and is doing that we shall adhere to it until we find that it is not worth while.

Dr. Muhlberg's reference to what his Company is doing shows that a very slight expenditure was made in comparison with the volume of their business. Since the institution of this privilege to policyholders, in 1914, we have paid out for this service, \$130,000, and we do justify it as being in keeping with our general welfare work, and as producing results which inure to the benefit of the business as a business and to the policyholders as a body.

If you are interested in any further details of this work, or

our other work of conservation of health and welfare work among policyholders and employees, I am sure we will be very glad to let you have quite a bit of information on the subject.

Dr. Wells—Mr. Chairman, I have a few statistics to bring to you to-day, in discussing the timely paper of Dr. Muhlberg. This whole question of the conservation of life is not alone one of dollars and cents, nor of comparative figures, so much as it is one of fundamental principle, which is before, not only the life insurance companies, but big business and the American people of to-day. Conservation simply means "saving," and America has heard of that. It has been heard of as an expedient. We have been through a tremendous experience, and our attention has been directed to the saving of coal, food, and all other resources. In addition, we were also brought face to face with the consideration of our physical condition, and one day woke up to the fact that, if we were to be a strong, virile nation, we must, among other things, save our health, and surely that question is of the utmost importance—the health of the American people. I believe that a paper such as this, and the way in which it has been presented, puts before the insurance world the thought that life insurance should participate in this forward movement—the saving of health and of human life.

The recent convention of the National Safety Council, held in Cleveland, discussed to some extent this question in a great many different phases, and it was considered by many very large employers of labor to be a field that all business should enter and actively participate in. There may be some objections to it from a life insurance standpoint, or among policyholders, but these can be overcome. When they come to understand the principle underlying a physical examination, whether for employment, or an annual one to safeguard health, and they are thoroughly acquainted with the end in view, objections will disappear. Some labor organizations to-day are arguing against the pre-employment examination. If you have followed the reports of some of the large labor conventions, you will find that much is said, and very decidedly and earnestly so, against the physical examination of the employee.

This point was referred to in the convention at Cleveland. One employer of labor after another brought out the fact, and it seemed to be the consensus of opinion that the main objections to the pre-employment examination of the employee, from a physical standpoint and a regular annual re-examination, came from and was fomented and encouraged largely by the labor agitator. One of the great arguments brought before the uneducated employee is that the examination is for the purpose of turning him out of employment, and throwing him upon the discard. When we can bring the great fact before the employer and the employee, and our body of policyholders as well, that this is a move in their interest, and that we are doing it to increase their efficiency and their health, their happiness, and their prosperity, I believe the objections offered will be withdrawn.

I am very glad that Dr. Muhlberg has brought out in his paper the subject of "improvement in mortality." I do not believe that the improved results, which we are experiencing quite generally in our life insurance selection, are entirely due to our medical examinations, or to medical selection in the Home Office. The mortality rate is improving throughout the country, and so is that of morbidity, and it is due to a great many influences, which are very clearly stated. There is a tremendous demand to-day for better health. Take for example the cities of New Orleans and Cincinnati, which, not long since, experienced a high mortality rate from typhoid fever, and their improved condition to-day, which is undoubtedly due to the great sewers which have been instituted and the modern filtration plants. These have practically eliminated typhoid and many other diseases. All of these things are having their effect, and we find that throughout the country there is a movement toward improved sanitation, which is beginning to show results.

Dr. Muhlberg speaks of "the field of legislation." I believe that this is one that we can legitimately enter and exert an influence in, not only among the various states, but in our national legislature as well, looking toward improved sanita-

tion and living conditions, and in these the life insurance companies certainly may have a large influence. This was illustrated very clearly a few years ago, when, you will recall, here in New York State, an effort was made to bring one of our large institutions, with five or six thousand delinquent boys and girls, from the center of the State, and locate it on the water-shed of New York City, near Lake Mahopac, thereby endangering the water supply of this city. The Merchants Association of this city took it up. The life insurance companies were requested to make objection to it, and did so in no uncertain terms before the Senate Investigating Committee. We informed these gentlemen that we were interested in this matter, not only from a mortality standpoint, but a moral one, as well; and, in order to safeguard the well-being of our policyholders, we strenuously objected to anything that would contaminate the water supply of this city. I also had the pleasure, in San Francisco, of appearing before an investigating committee, when the same condition threatened that territory. I am glad that Dr. Muhlberg has spoken of the influence that we have in legislation, or that we may have.

He speaks also of the question from an "educational standpoint"; that the life insurance companies can do much along this line through leaflets among our group and other policyholders as some other forms of placing this health information before them. I have made a very careful study among our groups, as to the effect of health leaflets and tracts, and have come to the conclusion that they are not universally read, hardly enough to justify the expense involved.

In the Equitable, we have a system of giving to our policyholders a free annual medical examination. We give, with our premium receipt a card, calling attention to the fact that, at certain points where we have salaried examiners, they are entitled to this service; and that every policyholder, no matter where he may live, may have the benefit of a yearly chemical analysis of the urine. I cannot say at present just how many have availed themselves of this service, but not as many as in the Metropolitan Life, such as Dr. Willard has spoken of. We

have not reached more than a small percentage of our policy-holders in this way.

The experience of the Union Central and the Equitable, regarding the age distribution and the percentage of impairments found among those availing themselves of the Free Health Examination, is very interesting, from our standpoint, because they run very nearly alike. Those found normal by the Union Central were 48% of the number examined, while we found 47% normal in our examinations. They found that 14.6 of those examined showed albumin, casts, blood, pus, etc., in the urine, and we found 10%. As to sugar cases, they found 1.7%, while we found only .3 of 1%. In overweights, our experience varies from theirs, the latter being 3.6%, and ours 11%. Underweights in the Union Central were 1%; with us, 1.7%—that is, under our 20% standard. Regarding age distribution, 41% of those examined by the Union Central were 39 years of age or less; ours 43%. Ages 40-49, Union Central, 33%; ours 28%. Fifty and over, Union Central, 24%; ours 27%. A very significant fact is that, out of the total of those examined by us, we found 53% who were unaware of any physical impairments, and who were in need of medical attention. This experience is practically borne out too by the reports of Surgeon-General Blue of the Public Health Service at Washington, who stated that 38% of the boys coming up before the army were found to have physical impairments sufficient to reject them for service; and, what is more significant, both with regard to the impairments that we found in our body of policy-holders and those of the boys examined for the army, a large percentage of them were preventable, and could have been cured, had their attention been directed early enough to apply the remedy. Surgeon-General Blue states that the largest number of impairments in boys applying to the army were due to heart and blood-vessel diseases (13%); the next were diseases of the bones and joints; and the third, diseases of the eyes. All of which might have been remedied and corrected.

Regarding the expenditure financially, we cannot say what our Free Health Examinations are costing us exactly, or what

we are obtaining in actual return or saving. However, we believe that the subject of the conservation of life and health is a deeper and more fundamental, a bigger and broader question, than the mere one of dollars and cents. It is in the air. It is the spirit of America to-day, and the life insurance company that attempts to help solve this problem is rendering a service. Responsibility does not end with the collection of the premium. If it is a good thing to put the protecting arm around a home stricken with death, to prevent poverty, suffering, hunger, and cold; to stand between these disasters and the mother and children, in my opinion, it is a better thing to put the protecting arm around the breadwinner while he lives, and thereby try to save him for his family and home. Thus, you bring the family into direct contact with the company, enabling them to realize that, after all, the latter is human and endeavoring to render assistance all along the line. This is a better logic, and we are approaching it in our country. Medicine is tending more and more to the great question of prevention. If it is a good thing to build the snug harbor, for the safety of the mariner, it is a better thing to rid the ocean of the pirate, the submarine, and the derelict, that the pathway of the navigator may be safe. And, I believe that the question now confronting us is how we can best clear the course for the breadwinner, so that he will live longer and better, both for his family and his country.

Dr. Muhlberg—Mr. President, the paper has been so well discussed by Dr. Willard and Dr. Wells that there remains practically nothing for me to add. I may state, however, or rather reiterate what I stated in my paper, there can be no doubt of the value of conservation work among policyholders. The only question that really must be decided is, how far shall we venture into this project, and how far will it prove profitable if we do so? That question can be answered only if we consider what we mean by profitable. If we mean financial profit, I believe that we can afford to expend a large amount of money and still realize on that expenditure very well indeed. I myself am very much inclined to agree with Dr. Wells that

it is not entirely a financial question, that the financial question should be placed in the background. We are physicians, and I think that any work of an altruistic nature is in line with our instincts and training. However, the executive officers of insurance companies must be convinced that such a procedure is a legitimate endeavor—and I believe they can be won over, provided the subject is presented to them as logically and as beautifully as Dr. Wells has submitted it to us.

Dr. McCulloch—If it is not out of order I would like to call attention to one particular thing. About four millions of young men have been very thoroughly vaccinated in the army, and it seems to me that it would be of great value to us, both from a conservation standpoint, and also for our subsequent compilation of statistics, if those of us who have questions regarding vaccination in our medical blanks, were to elaborate those questions a little by—"Vaccination for Small Pox" or "Vaccination for Typhoid." I believe that would be exceedingly valuable.

Dr. Jaquith—If I might be accorded the privilege of saying a word here. The Prudential has not been making physical examination of its policyholders, but has accorded, under conditions similar to those stated by Dr. Wells, the privilege of free urinalysis. We have found that about ten per cent of those entitled to this privilege have availed themselves of it, and it may be interesting to know that where the Union Central found 16.3% of abnormal urines, we find 16.5%, computed over a period of two years. We have also received many letters of appreciation from our policyholders.

Dr. Rockwell—The next paper to be discussed is that presented by Dr. Chester T. Brown, on "The Selection and Mortality Experience of Female Risks Which Have Undergone Intra-Abdominal Operations Upon the Pelvic Genital Organs."

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THE SELECTION AND MORTALITY EXPERIENCE OF FEMALE RISKS WHICH HAVE UNDER- GONE INTRA-ABDOMINAL OPERATION UPON THE PELVIC GENITAL ORGANS

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Dr. P. H. Ingalls's contribution to the proceedings of this Association in 1912, entitled "Selection of Female Risks in whom Hysterectomy and Ovariectomy have been Performed," first aroused my interest in this subject. The Prudential had been issuing policies to risks of this character and the thought came to me that material might be at hand for the estimation of a mortality experience. The group available for study is somewhat different than that which Dr. Ingalls discussed as is indicated by the titles of the two papers. In Table I are tabulated the various kinds of operations which make up the class under discussion. Table II gives the quinquennial ages and the Age Group 50-63 in approximate percentages as deduced from Table I. Risks with history of removal of one ovary overwhelmingly predominate the other groups of operations; the removal of two ovaries comes second and a gradual increase in operations upon the uterus is noted with the advance of age at entry. Panhysterectomies, to which it is presumed Dr. Ingalls's paper refers, formed only 4% of the whole group.

In 1908 the Prudential began to assume rather freely risks which had undergone intra-abdominal operation upon the pelvic genital organs. Prior to that time, only an occasional one had been insured. Two mortality investigations have been made. The first (Table III) was completed in 1914, the date of observation being December 31, 1913. There were then 828 risks on which the experience was 142% of the expectancy (M. A. Table). Purely as a coincidence, presum-

ably, the five deaths in excess of the expected were from conditions very closely related to the operation or the condition necessitating it (Claims Nos. 1, 2, 5, 13, and 15—Table V). In the light of this experience, our selection became more severe, yet the only general requirement added to the precaution of selection was that one year should elapse after complete recovery before the assumption of the risk. Recently an additional mortality experience has been calculated as of March 31, 1919 (Table IV). This includes the risks in Table III, together with all those assumed since December 31, 1913. Much to our surprise, the mortality was 91% of the expected. A satisfactory explanation of this variation is difficult to find. One is inclined to attribute it to the unreliability of small groups, and here it is of interest to note that were a variation calculated in accordance with the formula which Dr. Rogers mentioned in 1913 in his discussion of Dr. Dwight's paper "The Value of Small Classes," the actual deaths for the two investigations might be brought to common ground with a mortality very near 100% of the expected.

It is felt that in order to better understand this experience one should know of the manner in which this selection has been made. We have endeavored to learn the nature of the conditions which necessitated the operation, the symptoms present prior to operation and how long they had persisted, the nature of the operation, and the time required for recovery and the complete disappearance of all symptoms. This information, in most instances, was based upon the applicant's statements and the deductions which the examiner was able to make from his interrogations of the applicant. We had the benefits of practically no pelvic examinations. Thirty-five per cent. of the examinations accompanying the applications included urinalysis, the remaining 65% of the risks were assumed without an analysis of the urine, as it is the practice of the Prudential to issue without urinalysis policies of the kind to which this class of applicants was limited. In those instances in which an artificial menopause had occurred, we postponed acceptance until it was certain that climacteric

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symptoms had disappeared. Naturally we were more suspicious of hysterectomies and panhysterectomies than of ovariectomies, and the possibility of cancer was always uppermost in the mind of the one making the selection. After the investigation as detailed in Table III, risks were not assumed until one year after complete recovery from operation. History of inflammatory conditions of the adnexa were always the subject of scrutiny and the possibility of recurrence in the remaining pelvic organs or of the presence of adhesions, especially about the intestines, was always considered. Claims Nos. 1, 2, 5, and 13 resulted from these causes. One should realize that the question of build, family history, physical condition, and personal history, aside from the impairment under consideration, and certain features of moral hazard and insurable interest have been treated rather liberally because of the fact that the form of insurance issued to this class is of such a nature as to permit a more generous view of these features than could be entertained in the selection for standard ordinary business.

The first mortality investigation (Table III) indicates that Age Groups 30-34 and 35-39 bore the brunt of the mortality where the experience was 237% and 235%, respectively, of the expectancy. For the few years of exposure covered in this Table there is no indication of an improvement in mortality with the increase in the age of the policy. The second investigation (Table IV) includes the experience given in Table I extended through a little over five years of exposure, together with the experience on risks assumed since the beginning of 1914. One would imagine that it is the more accurate of the investigations because of the greater length of exposure and the larger number at risk. Age Groups 20-24, 30-34, and 35-39 predominate from a standpoint of mortality. There is no indication of a lessening mortality with the increase of insurance years.

Appreciating the danger of faulty deduction in the study of death claims of any group, I take the liberty to include in this paper Table V, which is a tabulation of the forty deaths

which have occurred. The first seventeen are those of the first investigation. Of these, five (Nos. 1, 2, 5, 13, 15) were very closely associated, from a historical standpoint, to the impairments under discussion. Following this experience, a more rigid selection was practiced with special regard to the lapse of one year after recovery before acceptance and it will be noted that but one death claim, No. 30, was associated with this class of impairments. There were no deaths which seemed to have been attributable to an artificial menopause. Four of the claims (Nos. 21, 22, 23, 30) resulted from the influenza epidemic of last fall. Below, the forty deaths are tabulated according to the nature of the operation and compared with the figures of Table II for all ages.

	<i>No. of Claims</i>	<i>Percentage of Claims</i>	<i>Percentage in Entire Group from Table II</i>
1 tube removed.....	1	2	3
2 tubes removed.....	1	2	3
1 ovary removed.....	23	58	57
2 ovaries removed.....	8	20	21
Operation for extra-uterine preg- nancy.....	2	5	4
Uterus removed.....	2	5	8
Panhysterectomy.....	3	8	4
Total.....	40		

Without dividing this entire group into seven smaller ones, according to the nature of the operation, and estimating a mortality experience upon each, no idea may be formed as to which of the various operations constitutes the most serious impairment, yet the manner in which the percentages in the second column approximate those in the third causes the impression that the mortality experience from one of these impairments does not vary markedly from the other except possibly for those who have undergone panhysterectomy.

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We have not yet reached the conclusion that all applicants of this class are eligible for standard insurance and we feel that the impairment is one calling for very careful selection, yet it would seem that many of these risks are not more seriously impaired than those who have undergone clean appendectomies.

TABLE I

TABULATION OF RISKS IN ACCORDANCE WITH NATURE OF OPERATION

RISKS ASSUMED UNTIL DEC. 31, 1913								
Age at Entry	One Tube Removed	Two Tubes Removed	One Ovary Removed	Two Ovaries Removed	Extra-Uterine Pregnancy Removed	Uterus Re-removed	Uterus Ovaries & tubes Removed	Total
18			1					1
19	1							1
20	1	2	4	1				8
21		1	6	3				10
22			16	1				17
23			4	5		1		10
24	2	1	16	1	4			24
25	6	2	17	9	2			36
26	1		31	6	2		1	41
27	2	2	19	5	3	1	2	34
28	1	1	30	6		1		39
29	1	3	37	11	2	3		57
30	1		24	11	3	3	2	44
31	1	1	25	10	3	3	3	46
32			24	4	2	2	2	34
33			23	11	1	2	3	40
34			18	8	1	2		29
35	1		19	8	2	3	2	35
36	4		21	11	1	3		40
37	1	1	23	4		2		31
38		4	16	14	2	4	1	41
39		2	16	10	1	1	2	32
40			18	11	2	5	2	38
41			10	3			1	14
42			17	4		2		23
43			8	4		3	1	16
44			7	3		3	1	14
45			8	2		4		14
46			7	1	1	3	1	13
47			3	1		1	1	6
48			2	3			1	6
49			1	2				3
50-63			16	7		7	1	31
Total	23	20	487	180	32	59	27	828

TABLE I—Continued

RISKS ASSUMED AFTER DEC. 31, 1913							
One Tube Removed	Two Tubes Removed	One Ovary Removed	Two Ovaries Removed	Extra Uterine Pregnancy Removed	Uterus Removed	Uterus Ovaries & tubes Removed	Total of Both Groups
		1					1
		2	3				5
2		5	3				8
1	1	4	1				8
		7	3	1			12
2	1	26	3		1		31
1	3	23	8	1	1	1	39
2	1	29	5	1	1		38
2	2	27	6	4	2		43
4	2	28	8				40
2	1	38	7	5	2	4	61
	4	31	10	2	1	1	51
3		41	9	4	3		57
5	3	40	15	6	2		69
1	1	31	14	5	3	1	60
3	3	35	16	6	4		65
2	1	30	8	2	5	3	52
1		27	7	4	2	3	45
	2	26	10	1	8	2	50
2	3	26	10	1	4	2	46
		18	15	2	6	1	44
1		17	5		5	3	31
		15	9	1		2	28
	1	7	6		4	1	20
	1	11	3	2	7	1	25
	1	5	5		8	3	22
		9	5		5	1	20
		9	3	1	3		16
1		4	4		4		12
	2	5	3	1	2	8	22
		5	3		5	1	14
		4	3		5	2	14
		13	6	2	22	6	49
36	33	599	216	53	115	46	1098
							1926

TABLE II
PERCENTAGE TABULATION OF RISKS IN ACCORDANCE WITH NATURE
OF OPERATION

	One Tube Removed	Two Tubes Removed	One Ovary Removed	Two Ovaries Removed	Extra- uterine Pregnancy Removed	Uterus Removed	Uterus Ovaries and tubes Removed
Age 25	9%	4%	62%	19%	4%	1%	0%
Age 30	1	0	65	20	7	6	2
Age 35	3	0	58	19	8	6	6
Age 40	1	0	50	30	5	8	6
Age 45	0	0	57	17	3	23	0
Age 50-63	0	0	36	16	3	36	9
All ages	3	3	57	21	4	8	4

TABLE III

MORTALITY EXPERIENCE ON POLICIES ISSUED TO APPLICANTS GIVING HISTORY OF OVARIOCTOMY OR HYSTERECTOMY.
EXPECTED DEATHS BY M. A. TABLE

Insurance Years	Ages at Entry 18-19				20-24				25-29				30-34			
	At Risk	Actual Deaths	Expected Deaths	Ratio %	At Risk	Actual Deaths	Expected Deaths	Ratio %	At Risk	Actual Deaths	Expected Deaths	Ratio %	At Risk	Actual Deaths	Expected Deaths	Ratio %
1	1.3		.004		69.3	1	.229	437	206.0	1	.721	139	195.8	3	.724	414
2					42.8		.193		147.7	1	.679	147	141.8	1	.681	147
3					28.1		.129		95.3		.448		90.7		.444	
4					17.3		.081		60.0		.288		60.7	1	.304	329
5					7.8		.037		33.3		.163		38.0	1	.198	
6					3.0		.014		13.9		.068		19.7		.104	962
7					1.0		.005		7.6		.038		6.8		.037	
8									6.8		.034		4.0		.022	
9									5.4		.028		2.7		.01	
10									4.0		.021		1.2		.007	
11									.9		.005					
I-II	1.3		.004		169.3	1	.688	145	580.9	2	2.93	80	561.4	6	2.536	237

TABLE III—Continued

Insurance Years	Ages at Entry 35-39				40-44				45-49				50-53			
	At Risk	Actual Deaths	Expected Deaths	Ratio %	At Risk	Actual Deaths	Expected Deaths	Ratio %	At Risk	Actual Deaths	Expected Deaths	Ratio %	At Risk	Actual Deaths	Expected Deaths	Ratio %
1	169.7	2	.696	287	97.3		.457		41.8		.268		21.5		.196	
2	126.2	1	.656	152	75.0		.480		28.3	1	.249	402	16.9		.211	
3	89.3	1	.482	207	46.3		.319		16.8		.160		11.0		.152	
4	58.2	2	.332	602	27.4	1	.206	313	10.6		.110		8.7		.131	
5	33.0		.195		15.8		.126		6.2		.070		6.3		.103	
6	10.8		.067		5.9		.050		1.4		.017		1.5		.026	
7	4.0		.026		1.3		.012									
8	4.0		.028		1.0		.010									
9	4.0		.030		1.0		.011									
10	3.1		.025		.3		.003									
11	1.7		.014													
1-11	504.0	6	2.551	235	271.3	1	1.674	60	105.1	1	.874	114	65.9		.819	

TABLE III—Continued

Ages at Entry				57-59				60				All Ages at Entry			
Insurance Years	At Risk	Actual Deaths	Expected Deaths	Ratio %	At Risk	Actual Deaths	Expected Deaths	Ratio %	At Risk	Actual Deaths	Expected Deaths	At Risk	Actual Deaths	Expected Deaths	Ratio %
1	5.8		.071		2.0		.032		1.0		.021	811.5	7	3.419	205
2	3.1		.049		2.0		.041		1.0		.028	584.8	4	3.267	122
3	1.4		.026		2.0		.048		.1		.009	381.0	2	2.211	90
4					1.0		.026					243.9	3	1.478	203
5					.9							141.3		.918	
6												56.2	1	.346	289
7												20.7		.118	
8												15.8		.094	
9												13.1		.084	
10												8.6		.056	
11												2.6		.019	
1-11	10.3		.146		7.9		.173		2.1		.052	2279.5	17	12.010	142

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Ages at Entry					20-24					25-29					30-34				
Insurance Years	At Risk	Actual Deaths	Expected Deaths	Ratio %	At Risk	Actual Deaths	Expected Deaths	Ratio %	At Risk	Actual Deaths	Expected Deaths	Ratio %	At Risk	Actual Deaths	Expected Deaths	Ratio %			
1	5.75		.0223		156.50	2	.7280	275	415.50	2	1.9978	100	475.00	5	2.3456	213			
2	3.00		.0135		115.25		.5391		310.75		1.5066	133	345.00	1	1.7154	58			
3	1.75		.0081		90.00	1	.4252	235	258.25	1	1.2570	80	273.25	1	1.3763	73			
4	.50		.0023		68.75		.3272		213.75	2	1.0440	192	214.50	1	1.0966	91			
5					51.25		.2447		160.25		.7899		162.00	1	.8412	119			
6					39.25		.1891		117.75		.5831		118.00	2	.6247	320			
7					25.50		.1238		82.00		.4095		74.75		.4954				
8					16.00		.0778		52.75		.2671		46.75		.2600				
9					7.75		.0378		31.50		.1617		32.75		.1890				
10					2.25		.0113		15.25		.0704		21.00		.1286				
11					.25		.0013		2.50		.0132		4.50		.0288				
12									1.00		.0054		3.00		.0198				
13									1.00		.0055		2.25		.0158				
14									.75		.0043		.25		.0019				
15																			
16									.25		.0014								
1-16	11.00		.0462		572.75	3	2.7053	111	1663.25	7	8.1259	86	1773.00	11	9.0491	122			

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TABLE IV—Continued

Ages at Entry				40-44				45-49				50-53				
Insurance Years	At Risk	Actual Deaths	Expected Deaths	Ratio %	At Risk	Actual Deaths	Expected Deaths	Ratio %	At Risk	Actual Deaths	Expected Deaths	Ratio %	At Risk	Actual Deaths	Expected Deaths	Ratio %
1	374.25	3	1.9799	152	208.25	1	1.2904	77	114.75		.9657		49.00	1	.5758	174
2	284.00	3	1.5355	195	167.50	2	1.0939	183	82.00	1	.7340		37.50	1	.4803	208
3	238.50	2	1.3237	151	143.00		.9907		67.00		.6460		28.75	1	.4001	250
4	197.25	1	1.1300	88	109.25		.8085		47.50		.4977		22.00		.3281	
5	148.25		.8849		84.25	1	.6631	151	34.25		.3851		18.50		.2965	
6	118.25		.7431		65.00		.5502		26.00	1	.3105	322	14.50		.2576	
7	80.50	1	.5337	187	41.75		.3752		13.75		.1792		9.00		.1710	
8	54.25		.3831		25.75		.2490		9.25		.1299		6.75		.1398	
9	33.25		.2524		15.25		.1622		4.75		.0735		5.00		.1143	
10	13.50		.1077		5.75		.0684		1.50		.0249		.75		.0180	
11	4.50		.0365		1.75		.0210									
12	4.00		.0338		1.00		.0115									
13	4.00		.0361		1.00		.0125									
14	3.25		.0320		.50		.0068									
15	2.50		.0272													
16																
1-16	1560.25	10	9.0396	111	870.00	4	6.3034	63	400.75	2	3.9465	51	191.75	3	2.7815	108

TABLE IV—Continued

Ages at Entry 54-56				57-59				60-63				All Ages at Entry			
Insurance Years	At Risk	Actual Deaths	Expected Deaths	Ratio %	At Risk	Actual Deaths	Expected Deaths	Ratio %	At Risk	Actual Deaths	Expected Deaths	At Risk	Actual Deaths	Expected Deaths	Ratio %
1	13.75		.2202		9.00		.1849		5.50		.1514	1827.25	14	10.4620	134
2	11.25		.1968		9.00		.1359		2.75		.0821	1365.00	10	8.0331	124
3	9.75		.1852		4.75		.1185		2.00		.0612	1117.00	6	6.7920	88
4	6.00		.1244		4.00		.1086		1.00		.0321	888.50	4	5.4995	73
5	2.75		.0639		3.00		.0905		1.00		.0354	665.50	2	4.2952	47
6	1.75		.0438		2.00		.0675		1.00		.0390	503.50	3	3.4086	88
7	.75		.0198		2.00		.0744		.25		.0107	330.25	1	2.3027	43
8					1.25		.0527					212.75		1.5594	
9					1.00		.0471					131.25		1.0380	
10					.25		.0129					60.25		.4512	
11												13.50		.1008	
12												9.00		.0705	
13												8.25		.0699	
14												4.75		.0450	
15												2.50		.0272	
16												.25		.0014	
1-16	46.00		.8541		33.25		.8930		13.50		.4119	7135.50	40	44.1565	91

TABLE V
TABULATION OF DEATH CLAIMS
APPLICANTS GIVING HISTORY OF HYSTERECTOMY OR OVARIOTOMY

No.	Age at Entry	Date of Operation	Nature of Operation	Policy Date	Date of Death	Duration of Policy	Cause of Death
1	24	1911	Drainage ovarian abscess	1913	1913	10 days	Ruptured ovarian abscess—General peritonitis
2	26	1909	1 ovary and appendix removed	1912	1914	1 yr. 5 mos.	Intestinal obstruction due to post-operative adhesions
3	29	1906	1 ovary removed	1911	1912	1 yr.	Suicide—hysterical melancholia
4	30	1908	1 ovary removed	1911	1911	4 mos.	Accidental drowning
5	31	1910	1 ovary removed	1911	1911	1 mo.	Intestinal obstruction—peritonitis
6	31	1907	1 ovary removed	1910	1911	11 mos.	Cancer and abscess of pelvis
7	33	1906	1 ovary removed	1909	1911	1 yr. 10 mos.	Heart and kidney insufficiency
8	33	1898	2 ovaries removed	1909	1914	4 yrs. 7 mos.	Cancer of stomach
9	34	1904	1 ovary, 1 tube and uterus removed	1905	1911	6 yrs.	Intestinal perforation—typhoid fever
10	35	1910	Panhysterectomy	1912	1913	1 yr.	Cerebral apoplexy—Interstitial nephritis
11	36	1907	2 tubes and 2 ovaries removed	1908	1911	3 yrs. 1 mo.	Chronic nephritis
12	37	1910	1 ovary removed	1912	1914	1 yr. 8 mos.	Cancer of stomach
13	38	1900	2 tubes removed	1910	1913	2 yrs. 7 mos.	Intestinal obstruction—attributed to old adhesions of operation
14	38	1904	1 ovary removed	1909	1913	3 yrs. 8 mos.	Cancer of uterus
15	39	1902	2 ovaries removed	1911	1911	6 mos.	Postoperative—result of operation for ventral hernia which had resulted from previous operation
16	44	1908	1 ovary removed	1912	1914	2 yrs. 1 mo.	Gastritis—pancreatitis
17	45	1908	2 ovaries removed	1912	1914	1 yr. 10 mos.	Peritonitis following gallstones

TABLE V—Continued

No.	Age at Entry	Date of Operation	Nature of Operation	Policy Date	Date of Death	Duration of Policy	Cause of Death
18	24	1910	Appendix and 1 ovary removed	1914	1914	8 mos.	Chronic myocarditis
19	24	1910	1 ovary removed—cyst	1915	1915	9 mos.	Chronic pericarditis
20	25	1908	2 ovaries removed	1911	1915	4 yrs.	Operation for cancer of uterus
21	26	1915	Extra-uterine pregnancy	1918	1918	3 mos.	Influenza and pneumonia
22	26	1913	1 ovary and appendix removed—cyst	1914	1918	3 yrs. 9 mos.	Influenza and pneumonia
23	27	1914	1 ovary and appendix removed	1916	1918	2 yrs. 2 mos.	Influenza and pneumonia
24	28	1912	1 ovary removed—abscess	1914	1916	1 yr. 11 mos.	Nephritis uremia
25	31	1911	2 ovaries removed	1915	1918	3 yrs. 3 mos.	Influenza
26	33	1903	1 ovary removed—tumor	1911	1916	4 yrs. 1 mo.	Peritonitis and septicemia following miscarriage
27	33	1906	2 ovaries and appendix removed	1911	1915	4 yrs. 3 mos.	Diabetic coma
28	33	1910	1 ovary removed—cyst	1911	1916	5 yrs. 6 mos.	Valvular heart disease
29	34	1917	1 ovary and 1 tube removed	1918	1918	4 mos.	Pulmonary congestion—Indigestion (?)
30	36	1914	Hysterectomy	1915	1916	8 mos.	Pelvic cancer
31	36	1912	Extra-uterine pregnancy	1915	1918	2 yrs. 2 mos.	Septicemia
32	37	1892	1 ovary removed—tumor	1910	1917	6 yrs. 8 mos.	Cerebral concussion and hemorrhage
33	39	1910	1 ovary removed	1915	1917	1 yr. 9 mos.	Burns—accidental
34	40	1910	2 ovaries removed—abscess	1913	1917	4 yrs. 3 mos.	Accidental
35	40	1906	Panhysterectomy	1914	1917	8 mos.	Cerebral hemorrhage
36	40	1915	Panhysterectomy	1916	1918	1 yr. 8 mos.	Acute Endocarditis
37	45	1897	1 ovary removed	1912	1918	5 yrs. 9 mos.	Periculous anemia
38	50	1907	1 ovary removed—cyst	1912	1915	3 yrs.	Intestinal carcinoma
39	50	1914	Hysterectomy for fibroids	1917	1918	1 yr. 1 mo.	Gastric ulcer-hemorrhage
40	51	1911	1 ovary removed—cyst	1914	1915	1 yr. 4 mos.	Myocarditis

Dr. Beckett—Mr. President: I am very glad that Dr. Brown has presented this excellent paper. Anything along the line of gathering statistics on this class of applicants is quite in place just at this time. We are going to have more applicants among women than we have had in the past; more women are going to enter commercial life; more women are becoming part owners in industrial enterprises, and more women are going to take out insurance.

I have no statistics to give you and I have not been able to find any along this line of cases that would be of importance. It seems to me that it will take quite a while to get any statistics that will guide us as to how we should act on female applicants who have undergone pelvic operations. The statistics that we will get will be largely from the applicants that we accept for insurance.

Surgeons compile very few statistics that are of importance to us as insurance men. You will remember that Dr. Mayo gave an address before our society two or three years ago on a surgical condition, but did not discuss just how much of an impairment the operations produced. He said he felt that the time elapsed had not been long enough to give him reliable statistics.

The thing that concerns us is—how much are these risks impaired by these operations; are they impaired sufficiently to require rejection or postponement, and, if postponement, for how long?

It is my opinion that we will have to consider each individual case.

Pelvic tumors in the younger applicants, especially fibromyomas, are more apt to become malignant than in the older subjects. It is impossible to make a diagnosis of malignancy in most of these growths prior to an operation. In many of these cases, the tumor, without a very careful microscopical examination is passed as a benign growth, while with a careful microscopic examination malignant changes will be found to have taken place.

It has been thought that a fibro-sarcoma of the uterus is not

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malignant, at least in the majority of cases, but it has been demonstrated that it is malignant and that metastasis may take place outside of the uterus. Sarcoma of the ovary is very often mistaken for a fibroid.

Delayed surgical treatment in these cases is a matter of importance. It is important for us to know, as Dr. Brown has well stated in his paper, the time the applicant had been afflicted before the operation took place. We all know that the results of early operations are much more favorable than delayed operations. There are fewer complications in the way of adhesions, malignant changes and recurrence, in the former than in the latter.

In any case where there has been any evidence whatever of malignancy, no matter how soon nor how complete the operation nor how prompt the recovery, I should say that the applicant is not insurable. We cannot know the extent of the invasion.

Unrecognized changes in tumors of the uterus and adnexa are contra-indications for X-ray treatment, and cases that have apparently been cured by X-ray treatment, I should hesitate to accept as insurance risks. We cannot say, at least for a number of years, whether these cases are completely cured or not. Our X-ray men claim very excellent results and you hear very much discussion between the X-ray men and the surgeons as to what treatment should be given in certain cases. We know that many cases claimed to be cured by the X-ray come to operation later on.

Extra-Uterine Pregnancy. Tubal pregnancy on one side may be followed by a tubal pregnancy on the other side if both tubes are not removed. Therefore, I would postpone these cases until time enough has elapsed to warrant us in believing that the woman is not going to become pregnant, or until she has gone through a normal pregnancy.

Complete removal of both ovaries. During the child-bearing period this usually brings about premature menopause and a train of nervous symptoms which render the applicant uninsurable until these symptoms have fully subsided.

Many of these pelvic cases have developed a heart or kidney lesion, and on that account a very careful physical examination should be made. Adhesions following these operations are largely in proportion to the size of the growth and the amount of inflammation which has been set up, as well as the manner in which the operation has been performed. Some surgeons are much more rough in their operating than others and for this reason the post-operative results are more or less severe.

It is difficult to get a complete history of these cases. Often we are not able to ascertain who operated, the nature or extent of the operation, whether a microscopical examination had been made and, if so, the result of the examination.

For these reasons it is a difficult matter to judge of the insurability of the case. Post-operative adhesions frequently cause disturbance during a subsequent pregnancy. Our rule has been to postpone all these cases for at least two years. I think one year, as a rule, is too short a time.

We usually get a very incomplete examination of women at the best; usually no vaginal examination at all, and I really believe that any woman who has undergone intra-abdominal operation on her pelvic organs should have a thorough pelvic examination made before we accept her for insurance. I know it is not practical in all cases, but I should be very much more favorably inclined to accept the risk after careful examination revealed a normal condition present.

I am exceedingly glad that Dr. Brown has presented this paper, and I hope that we will be able to get statistics as time goes by that will better enable us to judge of the insurability of these cases.

Dr. Porter—When invited by our President to participate in the discussion of the subject of "The Selection and Mortality Experience of Female Risks which have Undergone Intra-Abdominal Operation upon the Pelvic Genital Organs," I expressed doubt of the possibility of my doing so, owing to the paucity of material available in our records. A careful study of the cases confirmed my impressions, as it was found that the numbers were too small and available data inadequate to per-

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mit of conclusions of value. I regret exceedingly this fact, as the subject is one of special interest to me.

The necessary limitations in securing satisfactory personal histories of these cases, together with our inability to have pelvic examinations made by our personal representatives, impairs materially the value of studies of the subject from a scientific standpoint. With the material at hand, however, Dr. Brown has presented a most commendable report of the experience of the Prudential. The main interest is in consideration of the experience with oöphorectomies, which comprise the major part of the material embraced in his report. It would appear from his experience that the requirement of the lapse of one year after complete recovery before the assumption of the risk, would be adequate to secure satisfactory results. Our practice has been to postpone one or two years after complete recovery and to invariably obtain full statements from operating surgeons as to the exact character of operation and results.

Dr. Brown has brought out the fact that the information governing the selection of the risks was based mainly upon "the applicant's statement and the deductions which the examiner was able to make from his interrogations of the applicant." This, of course, is unavoidable, owing to the difficulty of obtaining satisfactory reports from the operating surgeons and hospitals. Ignorance of the exact facts on the part of many of the applicants and misrepresentations serve to mar the true value of the resulting data. It is further impaired, as stated, by the inability to secure reports of pelvic examination.

I was interested to note that the cases resulting in artificial menopause were only accepted after the disappearance of climacteric symptoms. This, to my mind, is important, and I would like to inquire from Dr. Brown as to the approximate average time of postponement resulting from this restriction. In my experience I have been impressed with both the direct and indirect complications resulting from this cause, which would serve to modify the ordinary expectancy of life of the individual.

In the absence of pathologists' reports covering microscopical examination of tissues removed by hysterectomy and pan-hysterectomy, it would appear that the limitation of one year after operation would be inadequate to give satisfactory protection; otherwise, it might suffice.

It is certainly an evident fact, as stated, that not all of this class of cases are eligible for standard insurance, and it is, in my judgment, of the utmost importance that complete histories from attending surgeons and physicians be obtained before accepting them as insurance risks.

In conclusion, I wish to compliment the writer of the paper upon the admirable manner with which he has dealt with the subject in compiling and tabulating the material at hand.

Dr. Rockwell—The officers of the Equitable extend to the members of the Association a cordial invitation to luncheon at the Bankers' Club, which has been arranged for the hour of 12.30. I hope that all of you will join us at luncheon.

AFTERNOON SESSION

The tellers announced the result of the balloting for the election of officers, as follows:

PRESIDENT

DR. FANEUIL S. WEISSE

FIRST VICE-PRESIDENT

DR. AUGUSTUS S. KNIGHT

SECOND VICE-PRESIDENT

DR. THOMAS F. McMAHON

Election of Officers

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SECRETARY

DR. ANGIER B. HOBBS

TREASURER

DR. CHARLES F. CHRISTIERNIN

EDITOR OF THE PROCEEDINGS

DR. ROBERT M. DALEY

EXECUTIVE COUNCIL

DR. G. A. VAN WAGENEN

DR. EDWIN W. DWIGHT

DR. ROBERT L. ROWLEY

Dr. Rockwell—At this moment it gives me very much pleasure to ask Dr. Weisse, the newly elected President, if he will come forward and show his genial countenance and say a few words to us.

Dr. Weisse—Gentlemen, I can only say that I thank you for this honor that you have conferred upon me. I do appreciate it as an honor. I worked, as you know, as Secretary of the Association, for six years, and I realize fully, from having watched the men who were our Presidents during that time, what it means to a man in the insurance business to be President of this Association. I know what the scope of the work is. It is growing and stretching out in all directions, and is becoming more scientific and more valuable every year. You who come to the meetings probably appreciate this, but not quite so much as the man who has been on the inside, watching the

work grow. I can only again reiterate my thanks, and hope that I may be able to do as well as my predecessors have done.

Dr. Rockwell—The first topic for the afternoon is one in which we were very much interested last year, and which continues to be of great importance to all life insurance companies, Influenza. Dr. Toulmin is unfortunately not able to be with us to-day, but Dr. Dillard represents him, and will present a supplementary statement to Dr. Toulmin's paper.

NOTES ON THE LIKELIHOOD OF A RECURRENCE OF SO-CALLED INFLUENZA

BY HARRY TOULMIN, M.D.

Medical Director, Penn Mutual Life Insurance Co., Philadelphia

I have no doubt that Dr. Rockwell, in asking me to take up this problem, fully realized the difficulty, if not the hopelessness, of predicting what is in store for the world during the coming months, in the direction of a possible outbreak of the epidemic which so staggered every quarter of the globe last fall and winter. Nevertheless, he must have felt that a calamity, which brought to mankind, in a few short months, untold misery, unheard of loss in human life, and an economic loss of such proportions that it can hardly be estimated, should be studied from all angles.

While we start with the knowledge that to predict is but to guess, there is a certain practical value in a study of this kind. A review of the story of the epidemic impresses us with the absolute necessity of being prepared for any eventuality. To state in the public press that there will undoubtedly be a recurrence, with even only a partial mortality of that experienced last year, might produce an anxiety on the part of the public which would be harmful rather than helpful. To quietly prepare for the worst, and hope for the best,

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should, I believe, be our first step. Health departments, —Federal, State, and local—have, I gather, taken this view, and will not be found unprepared. To assume that there will not be a recurrence and take no steps to meet a condition even faintly resembling that of a year ago would be criminal.

While it may be difficult to find direct ways in which we, as medical directors, can prepare for such an eventuality in protecting our policyholders and our staffs, certainly we can aid indirectly by giving support to all agencies whose work is in the field of health conservation.

In attempting to form some conclusion as to the probability of an outbreak during the coming months, we have to rely almost wholly on the history of preceding epidemics. As Byron truly said, "The best of prophets of the future is the past." If we are to base our "guess" on the earlier epidemic of thirty years ago, at the same time recognizing, as, of course, we must, certain marked differences between some outstanding features of that epidemic and the one of 1918-19, we might fully expect a recurring wave or recurring waves. For, it will be remembered, there were three well-defined "peaks," the first in January, 1890, the second in May, 1891, and the third in January, 1892. Still more marked are the "peaks," if one combines influenza with non-tubercular respiratory diseases.

We have, too, the fact, so often pointed out, that it is the nature of epidemics to recur, fortunately in diminished severity. I have not failed to remember that we have already had three "waves" in this last great epidemic, though the first and third "peaks" are, in comparison with the second or major wave, insignificant. Nor do I forget that in the minds of many there have been, for a few years past, mild outbreaks of influenza in this country.

My own conclusions are that we must anticipate and be prepared for a recurrence of the epidemic this winter, less widespread and far less fatal than that of last fall and winter. This is truly a "guess." But what I think is not a guess but can be stated as a positive fact, is the belief that even without

a true recurrence of the epidemic we will surely have a marked increase above the normal of deaths from pneumonia and the respiratory diseases and that every possible step should be taken to minimize the extent and severity of such a condition.

Having arrived at these conclusions, I wrote the following letter to men well known to you, as I appreciated fully that their opinions were worth far more than my own on this subject:

"I have been asked by the President of the Association of Life Insurance Medical Directors to present, at the next meeting of our Association, in October, a note on the likelihood of an outbreak of so-called influenza next fall and winter. I fully appreciate the fact that it is impossible for anyone to make a positive statement as to whether we will or will not have a recurrence, but one can at least prophesy, basing his 'guess' on the history of earlier pandemics and the history of this late pandemic in this and other countries. It will be a great help to me if you will tell me what your own impressions and expectations are."

From their replies I quote as follows:

"As you know, it is a characteristic of the disease to flare up several times before it finally disappears. I do not know how we can tell what it will do in any particular region of the country this winter, although it may very likely occur to some degree in certain places."—SIMON FLEXNER, The Rockefeller Institute for Medical Research.

"It is also reasonable to assume that for several years to come there will be a tapering off, so to speak, in the form of local, secondary outbreaks, but this is merely a speculation.

"I think that about the best attitude toward this question of recrudescence is that displayed in a leaflet published by a Committee of the American Public Health Association, December 13, 1918, entitled 'Influenza Bulletin: a Working Programme.' On page 15 you will find remarks on the probability of recurrence of the disease, but you will note that no positive statements are made, and that health departments are advised simply to be ready for anything that may occur. In fact, the measures therein advocated should

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have been incorporated in the programme of health departments in readiness for any epidemic."—LOUIS I. DUBLIN, Statistician, Metropolitan Life Insurance Co.

"My own 'guess' is that we will not have another such severe and distressing outbreak as we had last year; in fact, I rather doubt that the disease will become widely epidemic again."—G. W. MCCOY, Director, U. S. Public Health Service.

"It is, of course, extremely hazardous to express an opinion, but it is firmly believed, in the light of past experience, that a recurrence of the influenza epidemic is a foregone conclusion. There is no recognized periodicity, however, about the disease, as disclosed by statistical investigations. The point to be emphasized is the supreme importance of the acute respiratory diseases, generally ignored by health officers and members of the medical profession."—FREDERICK L. HOFFMAN, Third Vice-President and Statistician Prudential Insurance Co.

It is appropriate to acknowledge here the receipt from Dr. Hoffman of a series of charts, graphically depicting many interesting and important phases of several epidemics in this and other countries.

From those who discuss this paper I shall hope to obtain suggestions for the practical means of doing our part, should our worst fears be realized.

ADDITIONAL NOTE

Since the completion of the above paper I received the September 19th number of *Public Health Reports* (Vol. xxxiv, No. 38), containing an article on Influenza—"Relative to a Possible Recurrence of the Epidemic During the Fall or Winter." In connection with the conclusion arrived at above, it is interesting to refer to the "Statements which have been issued by the Public Health Service":

"Probably, but by no means certainly, there will be a recurrence of the influenza epidemic this year.

"Indications are, that should it occur, it will not be as severe as the previous pandemic.

"City officials, State and city boards of health, should be prepared in the event of a recurrence.

"The fact that a previous attack brings immunity in a certain percentage of cases should allay fear on the part of those afflicted in the previous epidemic.

"Influenza is spread by direct and indirect contact.

"It is not yet certain that the germ has been isolated, or discovered, and as a consequence there is yet no positive preventive, except the enforcement of rigid rules of sanitation and the avoidance of personal contact.

"A close relation between the influenza pandemic and the constantly increasing pneumonia mortality rate prior to the fall of 1918 is recognized.

"It is now believed that the disease was pretty widely disseminated throughout the country before it was recognized in its epidemic state. This failure to recognize the early cases appears to have largely been due to the fact that every interest was then centered on the war."

Dr. Dillard—Dr. Toulmin had intended to quote the following from an article in the *Medical Record* of August 9, 1919, by Dr. Hoffman:

"The two charts exhibiting the mortality from influenza in New York City during the period 1889-1918 are especially suggestive. They show an entire absence of influenza deaths during the first eleven months of 1889, but a sudden rise reaching epidemic proportions during January, 1890. Following this outbreak there was almost a complete disappearance of influenza deaths until March, 1891, the disease again reaching epidemic proportions during the early part of April. After May the disease practically ceased to occur in New York City until December, 1891, when, beginning with a slight rise of mortality, the disease once more reached epidemic proportions during January, 1892. Thus the course of the disease can be traced during the entire thirty years, or until 1918, when, following a period of nearly ten years of only occasional occur-

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rence, but never rising to the proportions of a serious epidemic, with the possible exception of a suggestive outbreak during the early part of 1916, the disease reappeared during the last week of September, 1918, and reached its maximum proportions during the fourth week of October. It may be questioned whether the history of medicine and statistics reveals a more suggestive illustration of the serious error of relying upon so-called *experience* as a safe forecast for the future. Anyone reviewing the influenza mortality statistics of New York City for the last sixteen years might well have reasoned that the disease in epidemic form had practically ceased to exist, although the comparatively slight outbreaks during the early part of 1916, 1917, and 1918 were all suggestive of a danger practically disregarded by both the public health authorities and those engaged in the practice of medicine as a healing art.

"The close interdependence of influenza and other respiratory diseases fails to suggest their relative importance in public health administration, and heretofore not even pneumonia has received the required amount of highly specialized consideration. The charts for New York City illustrate important variations in the mortality from pneumonia which may possibly serve as a suggestive index of future outbreaks of influenza. Apparently the mortality from bronchitis was not seriously affected in New York City by the enormous increase in deaths from pneumonia and influenza, as best shown by the chart exhibiting the facts of the epidemic period 1918-19, first for influenza and non-tuberculous respiratory diseases combined; and second, for pneumonia and bronchitis. The same conclusion applies to the chart illustrating the age distribution of the mortality in New York City from certain specified causes, or, in detail, for influenza, bronchitis and pneumonia. In this chart an effort is also made to compare the age distribution of deaths from causes stated during the epidemic years 1890-91 and 1918. It is shown that profound alterations in the age distribution of deaths from influenza occurred, but there were no very important changes in the mortality from bronchitis. The proportion of deaths from pneumonia decreased quite

considerably at the younger ages under five, increasing, however, materially at ages 25-44.

"A comparison of the monthly death rate from influenza and pneumonia on the basis of the data for the State of Massachusetts, for the periods 1887-92 and 1914-19, also reveals the extraordinary inconsistency in the groups, suggestive of the probability that the epidemic of 1918 was essentially at variance in its main characteristics with the epidemics of the past.

"In Massachusetts, however, the mortality from bronchitis reached a maximum point during the year of greatest frequency of influenza in 1892, but there seems to have been no such increase in the mortality from bronchitis during 1918.

"Even more remarkable, however, are the statistics of the mortality for four American cities, which in certain cases show an extraordinary consistency or similarity, but in others a wide degree of divergence. In Dayton and Columbus the disease recurred in serious epidemic form during October, 1918, culminating in a second outbreak, practically equivalent in seriousness to the first, in the month of December. In contrast it appears that in Pittsburgh there seems to have been no such recurrence, and in Cleveland the rate of maximum frequency during the first epidemic was not attained again during the second."

Dr. Fisher—Much has been written, in medical and insurance journals, as well as the daily press, as to the probable return of influenza, resulting in varied opinions, of little or no value. Evidently we are not to have anything approaching the epidemic of influenza of 1918. I think, however, that it is safe to predict that pneumonia will be much more prevalent for some time to come. We must not lose sight of the fact that the tendency of the average physician will be, for some time, to diagnose a variety of slight ailments, and especially common colds, as influenza, and to attribute, to many diseases, influenza as the remote cause of death, or as a complication which contributed to the cause of death.

I have as yet seen little in the death claims received by the

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company to lead me to believe that an attack of influenza leaves much, if any, lasting impairment of the constitution of those who have suffered from a well-defined attack of influenza and who have apparently regained their health. This is borne out by the very thorough investigation made by the health department of the city of Buffalo, which no doubt you are all familiar with.

I have investigated the records of the company to ascertain what complications, if any, could be discovered, following the epidemic of la grippe, which visited this country in 1889 and in subsequent years. The results are shown in Table I. All cases were included in which death occurred, during the years specified, with a well-defined attack of la grippe given as the immediate or contributory cause of death. The number of such deaths and the causes of death are given in Table II, as compared, each year, with the number of deaths from all causes occurring in the year specified.

I also present a table—III—showing the number of deaths as a result of influenza-pneumonia and complications, for the months of September, 1918, to July, 1919, inclusive, of both the civilian and military members of the Company. The record shows the month in which death occurred and not when the claim was received.

Also a table—IV—showing the causes of death of members of the Company who died while in the military and naval service of the United States, which may be of interest to the Association.

TABLE I

NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY—STATEMENT OF
DEATHS OF INSURED MEMBERS FROM LA GRIPPE AND COMPLICATIONS
DURING THE YEARS 1889 TO 1917, INCLUSIVE

Years	La Grippe Only <i>Number</i>	La Grippe and Complications <i>Number</i>	Total <i>Number</i>	Total Deaths All Causes <i>Number</i>	%
1889	1	10	11	678	1.6
1890	6	34	40	725	5.5
1891	5	20	25	772	3.2
1892	5	28	33	822	4.0
1893	3	9	12	875	1.4
1894	1	12	13	932	1.4
1895	2	7	9	993	.9
1896	3	5	8	1058	.8
1897	2	0	2	1154	.2
1898	1	9	10	1317	.7
1899	1	7	8	1463	.5
1900	2	28	30	1474	2.0
1901	9	17	26	1631	1.6
1902	1	23	24	1608	1.5
1903	4	28	32	1807	1.8
1904	4	33	37	1898	1.9
1905	4	26	30	1939	1.5
1906	1	24	25	1951	1.3
1907	2	51	53	2169	2.5
1908	3	30	33	2280	1.4
1909	0	5	5	2332	.2
1910	4	9	13	2533	.5
1911	5	9	14	2593	.5
1912	1	5	6	2650	.2
1913	1	25	26	2820	.9
1914	1	8	9	2915	.3
1915	6	14	20	3120	.6
1916	10	46	56	3283	1.7
1917	4	13	17	3382	.5
Total	.2% 92	1.0% 535	627	53,174	1.2

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TABLE II

NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY STATEMENT OF DEATHS
OF INSURED MEMBERS FROM LA GRIPPE AND COMPLICATIONS
DURING THE YEARS 1889 TO 1917, INCLUSIVE

CAUSES OF DEATH	AGES AT DEATH			
	16-39	40 & Over	Total	Per-centage
	No.			
La Grippe only.....	11	81	92	14.7
<i>La Grippe in the following complications:</i>				
Cancer and Sarcoma.....	0	1	1	.2
Diabetes.....	0	4	4	.6
Fever-malaria.....	0	2	2	.3
Fever-typhoid.....	1	2	3	.5
Rheumatism.....	1	4	5	.8
Tuberculosis—pulmonary.....	23	19	42	6.7
Tuberculosis other than pulmonary	4	1	5	.8
Miscellaneous.....	2	4	6	1.0
<i>Total General Diseases.....</i>	<i>42</i>	<i>118</i>	<i>160</i>	<i>25.5</i>
Apoplexy and Softening of Brain..	1	8	9	1.4
Encephalitis and Meningitis.....	13	19	32	5.1
Insanity.....	2	4	6	1.0
Paralysis, cause not stated.....	1	1	2	.3
Miscellaneous.....	3	2	5	.8
<i>Total Nervous System.....</i>	<i>20</i>	<i>34</i>	<i>54</i>	<i>8.6</i>
Angina pectoris.....	0	3	3	.5
Pericarditis.....	1	4	5	.8
Organic disease of heart.....	13	69	82	13.1
Arteriosclerosis.....	0	10	10	1.6
Miscellaneous.....	0	1	1	.2
<i>Total Diseases Circulatory System</i>	<i>14</i>	<i>87</i>	<i>101</i>	<i>16.1</i>
Asthma.....	0	6	6	1.0
Bronchitis.....	2	12	14	2.2
Pleurisy.....	2	8	10	1.6
Pneumonia.....	33	128	161	25.7
Miscellaneous.....	1	3	4	.6
<i>Total Respiratory System.....</i>	<i>38</i>	<i>157</i>	<i>195</i>	<i>31.1</i>
Appendicitis.....	1	1	2	.3
Intestines—disease of.....	3	11	14	2.2
Liver—disease of.....	4	0	4	.6
Stomach—disease of.....	1	12	13	2.1
Miscellaneous.....	1	2	3	.5
<i>Total Diseases Digestive System.</i>	<i>10</i>	<i>26</i>	<i>36</i>	<i>5.7</i>
Nephritis.....	4	27	31	4.9
Kidney—other diseases of.....	1	7	8	1.3
Miscellaneous.....	1	0	1	.2
<i>Total Genito-Urinary System.....</i>	<i>6</i>	<i>34</i>	<i>40</i>	<i>6.4</i>
Senility.....	0	34	34	5.4
Suicide.....	0	4	4	.6
Miscellaneous.....	0	3	3	.5
<i>Total Violent Deaths.....</i>	<i>0</i>	<i>41</i>	<i>41</i>	<i>6.5</i>
<i>Grand Totals.....</i>	<i>130</i>	<i>497</i>	<i>627</i>	
Percentage.....	20.7%	79.3%		

TABLE III

NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY STATEMENT OF DEATHS
OF INSURED MEMBERS FROM INFLUENZA-PNEUMONIA AND COM-
PLICATIONS (INCLUDING DEATHS DUE TO PNEUMONIA ONLY)
WHICH OCCURRED DURING THE FOLLOWING MONTHS

Months	CIVILIANS				ARMY AND NAVY SERVICE				TOTAL			
	Ages at Death		Ages at Death		Ages at Death		Ages at Death		Ages at Death		Ages at Death	
	16-39	40 & Over	16-39	40 & Over	16-39	40 & Over	16-39	40 & Over	16-39	40 & Over	16-39	40 & Over
	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount
1918												
Sept.	28	\$101,633	12	\$54,265	37	\$59,000	1	\$1,000	65	\$160,633	13	\$55,265
Total	#40	\$155,898			#38	\$60,000			#78	\$215,898		
Oct.	453	1,160,540	159	676,569	203	400,513	2	12,000	656	1,561,053	161	691,569
Total	#612	\$1,840,109			#205	\$412,513			#817	\$2,252,622		
Nov.	210	552,685	78	275,123	30	50,500	2	6,000	240	603,185	80	281,123
Total	#288	\$827,808			#32	\$56,500			#320	\$884,308		
Dec.	248	830,753	96	514,538	25	191,000	...	...	273	1,021,753	96	514,538
Total	#344	\$1,345,291			#25	\$191,000			#369	\$1,536,291		
1919												
Jan.	161	478,800	72	274,027	20	32,000	...	...	181	510,800	72	274,027
Total	#233	\$752,827			#20	\$32,000			#253	\$784,827		
Feb.	62	249,323	49	258,533	21	52,700	1	706	83	302,023	50	259,239
Total	#111	\$507,856			#22	\$53,406			#133	\$561,262		
Mch.	56	136,800	58	201,261	5	7,000	1	1,000	61	143,800	59	202,261
Total	#114	\$338,061			#6	8,000			#120	\$346,061		
Apr.	21	64,500	29	135,014	...	...	...	...	21	64,500	29	135,014
Total	#50	\$199,514							#50	\$199,514		
May	6	9,452	13	144,000	1	1,000	...	...	7	10,452	13	144,000
Total	#19	\$153,452			#1	\$1,000			#20	\$154,452		
June	4	42,000	6	65,000	1	1,000	...	...	5	43,000	6	65,000
Total	#10	\$107,000			#1	\$1,000			#11	\$108,000		
July	1	1,000	5	75,500	1	1,000	...	...	2	2,000	5	75,500
Total	#6	\$76,500			#1	\$1,000			#7	\$77,500		
Grand Total	1250	\$3,627,486	577	\$2,676,830	344	\$795,713	7	\$20,706	1594	\$4,423,199	584	\$2,697,536
Great Total	#1827	\$6,304,316			#351	\$816,419			#2178	\$7,120,735		
Average Amount per Member					\$3.451		\$2.326		\$3.269			
Average Age at Entry					29.4		22.8		28.4			
Average Age at Death					38.1		27.2		36.2			
Average Years Insured					8.7		4.4		7.8			

43.04 per cent. of all deaths sustained by the Company, occurring during the months of September, 1918, to June, 1919, both inclusive, were due to Influenza-Pneumonia and complications.

Discussion—Recurrence of Influenza 63

TABLE IV

NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY DEATHS OF INSURED MEMBERS IN MILITARY AND NAVAL SERVICE DURING THE WORLD WAR

	DEATHS DUE TO CASUALTIES					DEATHS OVERSEAS					DEATHS WITHIN UNITED STATES AND CANADA					Grand Total
						AGES AT DEATH					AGES AT DEATH					
	Under 20	20-29	30-39	40 & Over	Total	Under 20	20-29	30-39	40 & Over	Total	Under 20	20-29	30-39	40 & Over	Total	
Killed in Action.....	2	221	51	6	280	..	...	..	..	...	..	...	..	..	...	280
Wounds received in Action.....	..	63	14	..	77	..	1	1	..	2	..	...	..	..	...	79
Missing in Action.....	..	2	5	..	7	..	...	..	..	...	..	...	..	..	...	7
Aero and Sea-plane.....	..	10	3	..	13	..	14	2	1	17	..	...	..	..	...	30
Submarine.....	..	7	1	..	8	1	1	..	..	2	..	...	..	..	...	10
Drowning—accidental....	..	4	2	1	7	..	5	2	..	7	..	...	..	..	...	14
Auto and motorcycle.....	..	1	2	..	3	..	1	3	..	4	..	...	..	..	...	7
Thrown from horse.....	1	...	...	..	1	..	2	..	..	2	..	...	..	..	...	3
Railroad accident.....	..	3	1	..	4	..	2	..	..	2	..	...	..	..	...	6
Miscellaneous.....	..	1	...	..	1	..	2	1	1	4	..	...	..	..	...	5
Total.....	3	312	79	7	401	1	28	9	2	40	1	28	9	2	40	441

DEATHS DUE TO DISEASES	PERCENTAGE TO ALL DEATHS				Casualties	Diseases			
	Under 20	20-29	30-39	40 & Over		Under 20	20-29	30-39	40 & Over
Appendicitis.....	3	..	..	3
Brain	2	1	..	3
Cancer.....	1	..	..	1
Diabetes.....	1	..	..	1
Diphtheria.....	..	2	...	..	2	..	2	..	2
Fever—Scarlet—Typhoid	..	4	...	..	4	..	1	..	1
Heart Disease.....	..	1	...	..	1	..	1	1	2
Intestinal Disease.....	..	2	1	..	3	..	1	2	3
Influenza-Pneumonia....	..	44	15	3	62	3	125	33	164
Pneumonia only.....	..	40	27	..	67	..	74	18	94
Kidney Disease.....	..	1	...	..	1	..	1	..	1
Measles.....	..	1	...	..	1	1	1	2	4
Meningitis.....	..	6	1	..	7	..	5	2	7
Mastoid Disease.....	..	1	...	..	1	..	2	..	2
Nephritis.....	..	1	1	..	2	..	1	1	3
Pleurisy.....	..	1	1	..	2	..	7	..	7
Rheumatism.....	1	..	..	1
Septicemia.....	..	2	...	2	4	..	1	1	2
Suicide.....	..	2	2	2	6	..	4	3	8
Tuberculosis.....	..	3	...	..	3	..	9	..	9
Miscellaneous.....	..	1	...	2	3	..	1	2	1
Total.....	..	112	48	9	169	4	244	66	322
Grand Total.....	3	424	127	16	570	5	272	75	362

Average Age at Entry
Average Age at Death
Average Years Insured

22.8
27.0
4.2

Amount of Insurance
Average Amount per Member

\$2,034.846
2.183

THE NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY

DEATHS IN 1916

AVERAGE AGES WHEN INSURANCE WAS ISSUED AND AT TIME OF DEATH

CAUSES OF DEATH	Number of Lives	Average Age at Entry	Average Age at Death	Average Years Insured
Cancer.....	252	41.3	58.9	17.6
Diabetes.....	84	37.5	56.5	19.0
Typhoid fever.....	47	32.2	41.1	8.9
Rheumatism.....	20	37.1	51.9	14.8
Tuberculosis—pulmonary.....	182	30.8	41.3	10.5
Tuberculosis other than pulmonary.....	36	29.7	38.9	9.2
Miscellaneous.....	157	36.2	50.1	13.9
Total General Diseases.....	778	36.4	50.6	14.2
Apoplexy and Softening of Brain.....	238	40.6	60.1	19.5
Encephalitis and Meningitis.....	19	31.3	39.8	8.5
Insanity.....	64	37.0	50.2	13.2
Locomotor ataxia.....	19	34.9	51.2	16.3
Paralysis, cause not stated.....	32	41.2	62.7	21.5
Miscellaneous.....	56	33.8	47.3	13.5
Total Nervous System.....	428	38.5	55.8	17.3
Angina Pectoris.....	120	42.2	60.3	18.1
Pericarditis.....	2	43.0	59.0	16.0
Organic disease of heart.....	333	41.8	61.0	19.2
Arteriosclerosis.....	143	42.6	65.4	22.8
Miscellaneous.....	10	37.5	58.3	20.8
Total Diseases Circulatory System...	608	42.1	61.8	19.7
Asthma.....	7	42.7	63.3	20.6
Bronchitis.....	7	35.8	64.7	28.9
Pleurisy.....	15	33.7	43.6	9.9
Pneumonia.....	239	39.4	54.2	14.8
Miscellaneous.....	5	51.6	67.6	16.0
Total Respiratory System.....	273	39.5	54.4	14.9
Appendicitis.....	71	34.3	42.2	7.9
Diseases of intestines.....	36	38.0	51.1	13.1
Diseases of liver.....	76	39.2	55.1	15.9
Diseases of stomach.....	59	37.7	54.4	16.7
Miscellaneous.....	17	33.6	49.7	16.1
Total Diseases Digestive System....	259	37.1	50.5	13.4
Bladder, disease of.....	3	41.9	66.0	24.1
Nephritis.....	314	41.0	59.6	18.6
Kidneys, other diseases of.....	13	38.0	56.5	18.5
Prostate, disease of.....	36	42.9	70.4	27.5
Miscellaneous.....	2	34.5	62.0	27.5
Total Genito-Urinary System.....	368	41.1	60.5	19.4
Casualties.....	217	32.8	42.1	9.3
Senility.....	155	42.4	83.7	41.3
Suicide.....	95	36.0	47.5	11.5
Miscellaneous.....	102	36.5	48.8	12.3
Total Violent Deaths.....	569	36.4	55.5	19.1
Grand Total.....	3283	38.7	55.6	16.9

Discussion—Recurrence of Influenza 65

THE NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY

DEATHS IN 1917

AVERAGE AGES WHEN INSURANCE WAS ISSUED AND AT TIME OF DEATH

CAUSES OF DEATH	Number of Lives	Average Age at Entry	Average Age at Death	Average Years Insured
Cancer.....	250	40.1	58.9	18.8
Diabetes.....	87	36.2	54.6	18.4
Diphtheria.....	8	32.8	41.4	8.6
Typhoid fever.....	32	33.7	41.6	7.9
Rheumatism.....	22	34.3	51.0	16.7
Tuberculosis—pulmonary.....	223	31.4	42.2	10.8
Tuberculosis other than pulmonary.....	27	31.6	40.7	9.1
Miscellaneous.....	173	37.2	50.5	13.3
Total General Diseases.....	822	36.7	50.5	13.8
Apoplexy and Softening of Brain.....	261	41.6	62.2	20.6
Encephalitis and Meningitis.....	27	35.7	45.9	10.2
Insanity.....	62	34.3	48.7	14.4
Locomotor Ataxia.....	11	36.1	54.1	18.0
Paralysis, cause not stated.....	19	39.1	64.2	25.1
Miscellaneous.....	63	39.5	48.9	9.4
Total Nervous System.....	443	40.0	56.9	16.9
Angina Pectoris.....	124	40.2	61.7	21.5
Pericarditis.....	2	35.0	45.5	10.5
Organic disease of heart.....	294	40.8	60.8	20.0
Arteriosclerosis.....	118	42.1	67.4	25.3
Miscellaneous.....	23	36.3	56.5	20.2
Total Diseases Circulatory System....	561	41.1	62.1	21.0
Asthma.....	9	43.7	60.2	16.5
Bronchitis.....	10	42.1	69.6	27.5
Pleurisy.....	15	37.3	48.9	11.6
Pneumonia.....	282	38.0	53.5	15.5
Miscellaneous.....	19	36.3	53.3	17.0
Total Respiratory System.....	335	38.1	53.9	15.8
Appendicitis.....	56	33.6	42.5	8.9
Diseases of intestines.....	43	38.6	55.5	16.9
Diseases of liver.....	74	38.1	56.0	17.9
Diseases of stomach.....	52	36.9	52.5	15.6
Miscellaneous.....	21	37.4	51.2	13.8
Total Diseases Digestive System.....	246	36.9	51.7	14.8
Bladder, disease of.....	12	39.3	67.4	28.1
Nephritis.....	327	39.7	59.1	19.4
Kidneys, other diseases of.....	12	39.0	50.2	11.2
Prostate, disease of.....	34	44.2	71.9	27.7
Miscellaneous.....	2	39.0	56.0	17.0
Total Genito-Urinary System.....	387	40.1	60.2	20.1
Casualties.....	239	35.1	42.3	7.2
Senility.....	166	42.5	84.0	41.5
Suicide.....	79	35.3	45.3	10.0
Miscellaneous.....	104	37.9	50.9	13.0
Total Violent Deaths.....	588	37.5	56.0	18.5
Grand Total.....	3382	38.8	55.7	16.9

Dr. R. L. Rowley—The pandemic of influenza which swept over the world in 1918 was the most severe outbreak of this disease which has ever been known. While it is impossible to make any precise statement of the number of people who lost their lives because of this epidemic it is certain that the total is an appalling one.

Undoubtedly a great many more people died from this cause than from all causes directly connected with the military operations of the Great War.

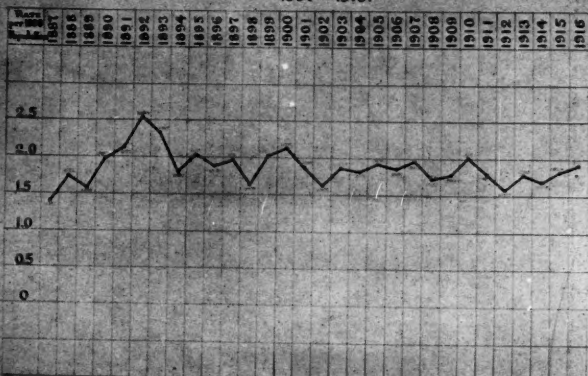
In the United States alone conservative estimates place the deaths from the influenza epidemic at not less than 550,000, which is approximately five times the number of American soldiers officially stated to have lost their lives from all causes in the war.

The history of influenza, so far as it is known, that is for several centuries, comprises a series of long cycles in which great pandemics alternate with periods of relative quiescence, the length of cycles as measured by the intervals between pandemics being usually a matter of decades. The special characteristics of influenza pandemics are their wide and rapid extension, their high morbidity, and their great effect upon general mortality.

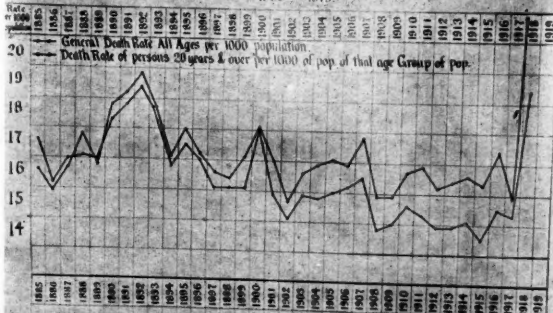
These cycles appear to be of fundamental significance in the natural history of influenza and it will be of interest to review the cycle from the last pandemic in 1890 to the present.

This is possible in a general way by reference to the mortality records in Massachusetts and in Connecticut. These records are indicated on the accompanying charts, which I shall explain in a moment. My hope was that from a study of these charts we would be able to guess more intelligently as to the likelihood of general mortality rates returning to normal in the near future. Chart I shows the death rate per 1000 in Massachusetts by years from 1887 to 1916, inclusive, due to pneumonia (all forms) and influenza. Chart II shows the corresponding rates in Connecticut and the upper part of this chart shows the curve of general mortality in Connecticut, years 1885 to 1918 inclusive.

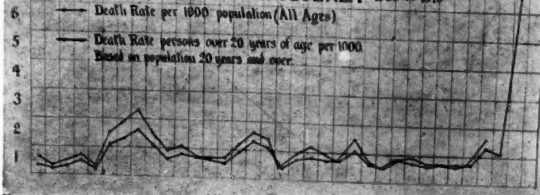
DEATH RATE FOR STATE OF MASS from Pneumonia (all forms) & Influenza 1887 to 1916.

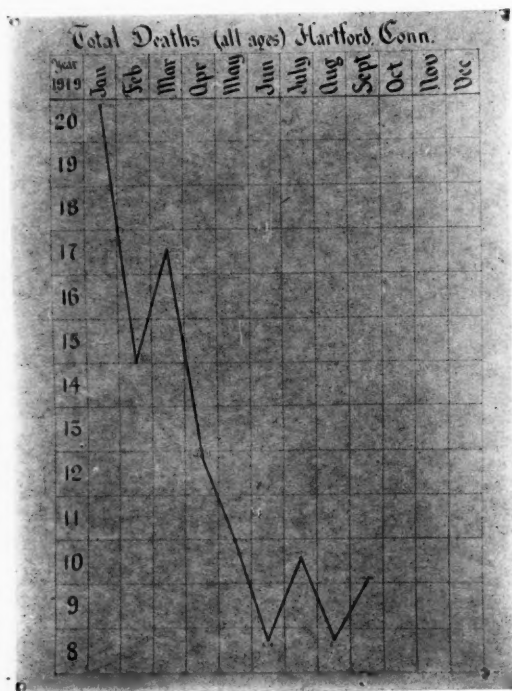
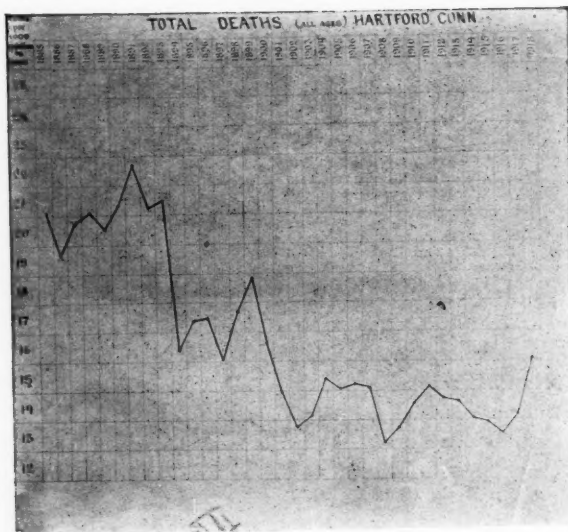


DEATH RATE FOR STATE OF CONNECTICUT 1885 to 1919



PNEUMONIA (all forms) AND INFLUENZA 1885 to 1919





Discussion—Recurrence of Influenza 67

It is frankly admitted by public health authorities that no one can say with any certainty whether there will be a recurrence of last year's experience, and we have this statement from the U. S. Public Health Service that, "Probably, but by no means certainly, there will be a recurrence of the influenza epidemic this year. Indications are that should it occur, it will not be as severe as the previous pandemic."

Dr. Toulmin has said that "to predict is but to guess" and it is natural, therefore, for men of scientific minds to express themselves with great caution. Many of the views that have been expressed are characterized by a lack of optimism, due no doubt in part to the well known fact that in England and Wales the curve of mortality from influenza did not return to normal for several years after the epidemic of 1890, and the decline in the mortality rate after the 1848 epidemic in Great Britain was similarly slow. It is to be hoped that there can be found a basis for some degree of optimism by reference to the charts that show the curves of mortality in Connecticut and for Hartford, respectively, for the years 1885 to 1918 inclusive. After each rise in the curve of general mortality due to influenza or to pneumonia or to both together, there has been a drop in the curve of general mortality to a new low level. That is seen following the epidemic of influenza in 1890-1893; following the epidemics of pneumonia in 1900 and in 1907; it is less noticeable following the milder increase of pneumonia in 1910 and 1911. It is hardly safe to draw any conclusion from the *type* of curve representing an increase of general mortality. Nevertheless a curve that rises rapidly to an unusual height seems to have a tendency to fall abruptly and to fall to the vicinity of the base line. This is shown in a number of mortality curves published by the U. S. Public Health Service in connection with influenza studies.

We all are conscious of the low general mortality that now prevails throughout this country and the life insurance companies are with much satisfaction making note of this in their mortality records for the past few months.

The general mortality for the first nine months of this year

in the city of Hartford may be fairly typical of, or at least may show the trend of mortality in other places, and I have indicated by the appended chart the general mortality by months of this year. May, June, July, August, and September had lower rates than any corresponding month in any other year on record. In fact, June and August had the lowest rates ever recorded. Notwithstanding the high mortality rate for the first three months of this year in Hartford, the average for the nine months is 12.81 per thousand. If we can assume that a corresponding drop in mortality has been experienced throughout the State and we were to extend the curve on the State chart it would show a drop to a point lower than ever before reached.

Some writers have commented upon the after effects of influenza as being a matter of great seriousness. In the city of Buffalo exhaustive inquiry was made of 33,880 cases of influenza reported to the Department of Health to determine what the after effects were. The cases were reported between October 1, 1918, and March 31, 1919.

The report says, "This reveals one of the most remarkable conditions and one which is at variance with the generally accepted state of affairs, namely, that out of 33,880 cases of influenza and pneumonia only eight could be definitely classed as cases of tuberculosis, no more than would ordinarily be expected among so many in any community."

The summary of the report dated June 30, 1919, shows that in all, 748 cases were found to have some form of sequellæ. One hundred of these were mild cases of ear, eye, nose, and throat infections; forty-six cases were classified under circulatory system and forty-six under nervous system. The others were scattered and miscellaneous.

Of the 748 cases found on first examination to have some form of sequellæ, 501 at the time of this report (June 30th) had recovered and 216 were reported as improving. It was further stated that the nature of the reports indicated that practically all of the 216 cases would soon be discharged as recovered. The balance of the cases, which would number 31, are not accounted for in the report.

Discussion—Recurrence of Influenza 69

The report further states, "In contradistinction to observations relative to previous epidemics, we do not anticipate any serious results among the people who had influenza in Buffalo, and recovered. Our mortality appears associated and not deferred."

While it is to be remembered that this sketchy bit of information does not permit us to draw any definite conclusions as to the general mortality rates that will prevail throughout the country in the next few years, there does appear to be some basis for entertaining the hope as well as the expectation that the pessimists will be shown to have made the wrong guess.

Dr. Rockwell—I am sure we are indebted to both Dr. Fisher and Dr. Rowley for a continuation of Dr. Toulmin's paper. The subject is so important and of so much interest to us all that I think I will ask that the discussion become a general one, if there are other members present who will favor us with their views on the subject.

Dr. Symonds—I have a chart here showing our painful experience in this recent epidemic. This represents the deaths arranged by weekly periods, beginning with September 28, 1918, and it represents our experience down to September 30th of this year.

The solid line represents the number of deaths, and starting from a mortality in the week ending September 21st, of fourteen deaths from influenza, it shot up very rapidly until it reached a maximum of 310 deaths in the week ending October 26th, then there was almost a vertical drop down to a level of 90 deaths in a week, the week ending November 16th; it stayed at a level for three or four weeks and there was another top in the week ending December 14th; again it fell fairly promptly to a new low level on December 28th, remained there for a week, and shot up again to a small top in the middle of January. Then it fell, fairly uniformly, down to the week ending

February 22d. Again there was a slight rise which was spread over a period of three or four weeks, to March 22d, and from that time on there has been a fairly steady fall.

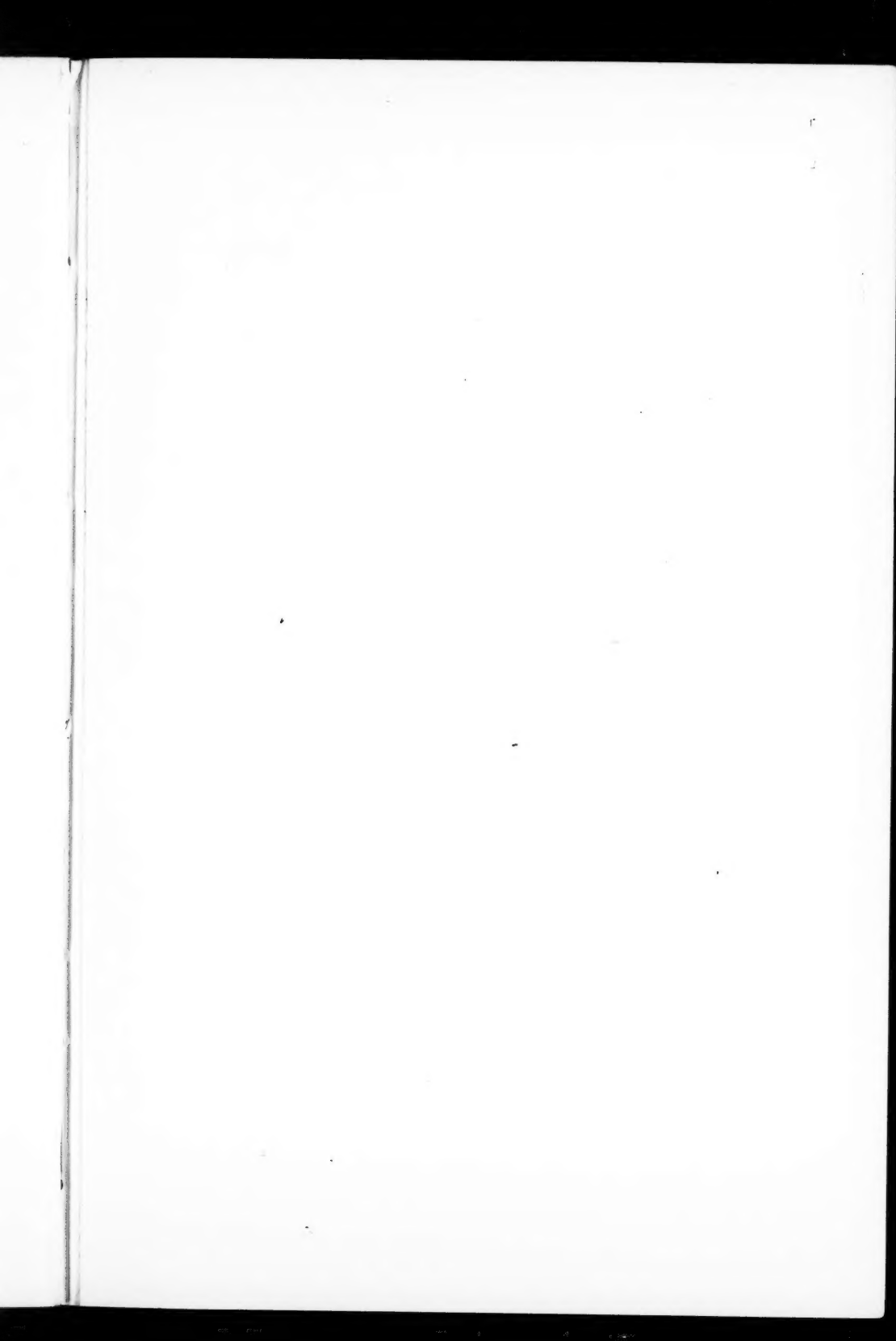
With regard to the likelihood of a recurrence, the thing of interest is the very sharp tops, the one beginning in October, the next in the middle of December, one in January, and finally one in March.

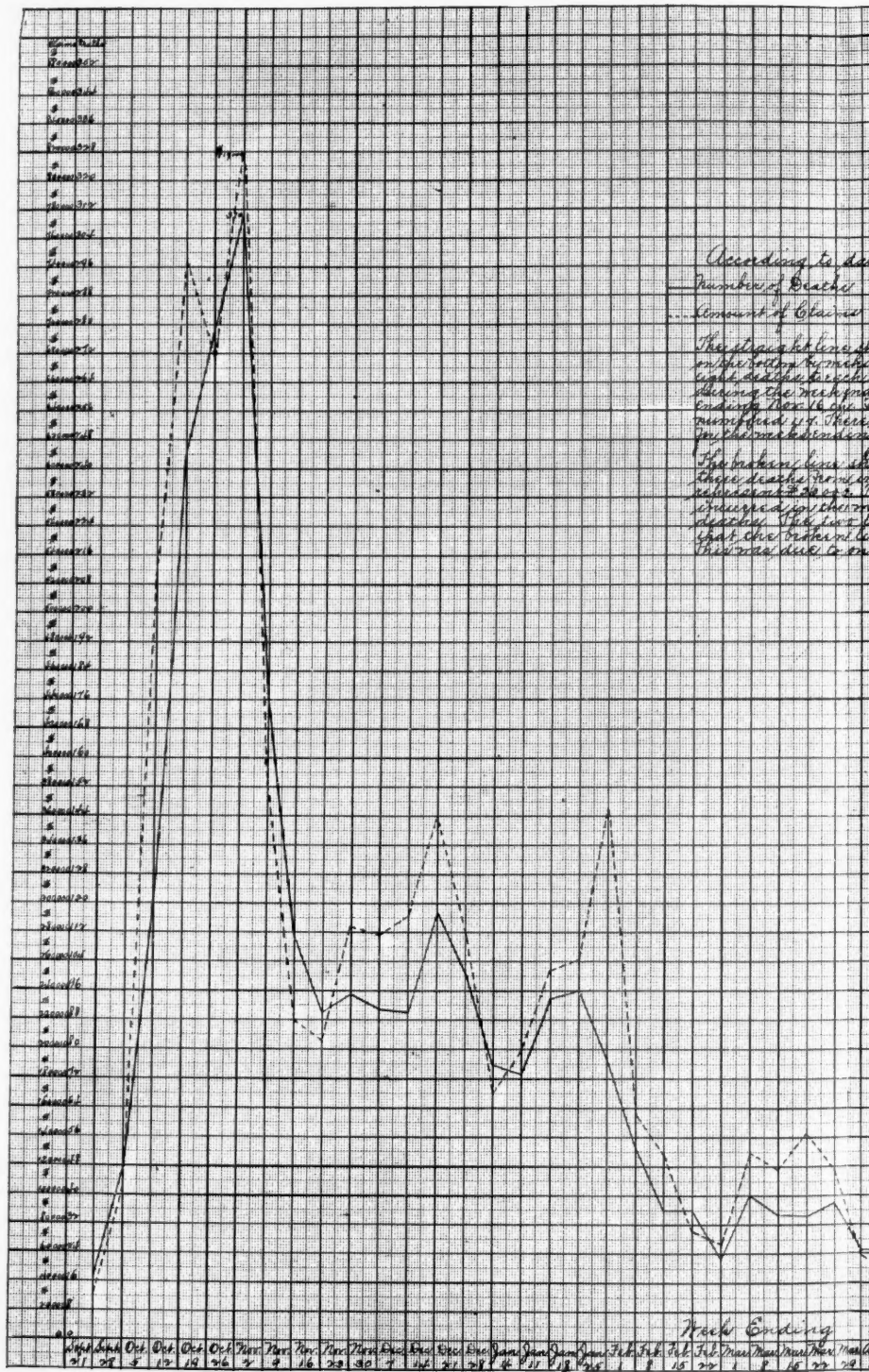
The tendency of influenza has been to show these tops, but usually the tops have been separated by a period of many months or even years. In this epidemic, owing to the conditions perhaps that were prevalent at that time, with a very large movement of troops into and out of the cantonments, the disease was spread with very great rapidity, and very thoroughly all over the country, and I think this evidence of these four tops rather points to the fact that we have exhausted the available material for influenza. Personally I doubt if we have any further epidemic, although there may be some little increase in the influenza deaths. I have noticed in the last reports of the Census Bureau that there was a slight increase in some cities of influenza deaths, but only a slight increase, and most of the cities showed none. I do not see any evidence of it coming.

The broken line shows the losses, which almost coincide with the deaths, excepting in one spot where there was a very painful death of \$53,000, which carried the line considerably higher than the black.

Dr. Beckett—I would like to ask if anyone has had any experience that is worth while with the use of the mask during the epidemic.

Dr. McCullough—Answering Dr. Beckett's question with regard to the use of the mask, I had charge of a hospital in France during last year in the height of the epidemic. It was a hospital with a capacity of 200 beds, at least 80% full of this type of cases. The nurses and attendants in every case were masked, and there were only two cases during a matter of six weeks among the hospital attendants, either nurses or orderlies, who contracted the disease itself. I would be very firm





Epidemic Influenza - Graph

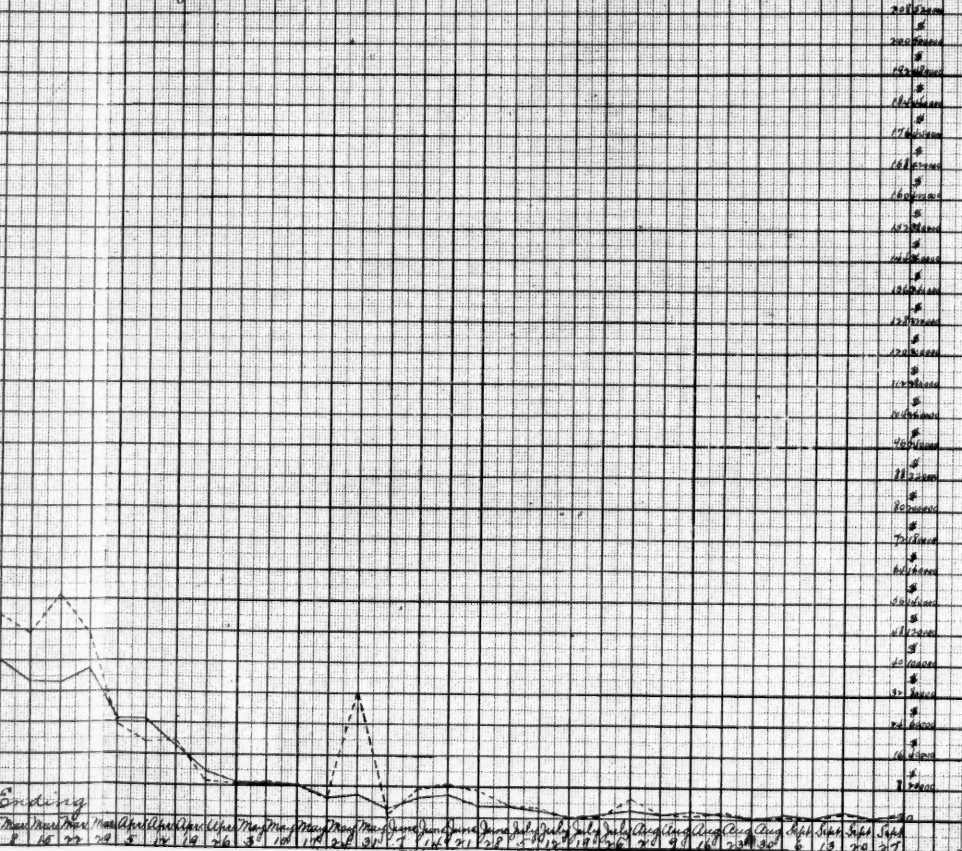
ording to date of death, which has been ordered paid from Sept. 1918 to Oct. 1, 1919.

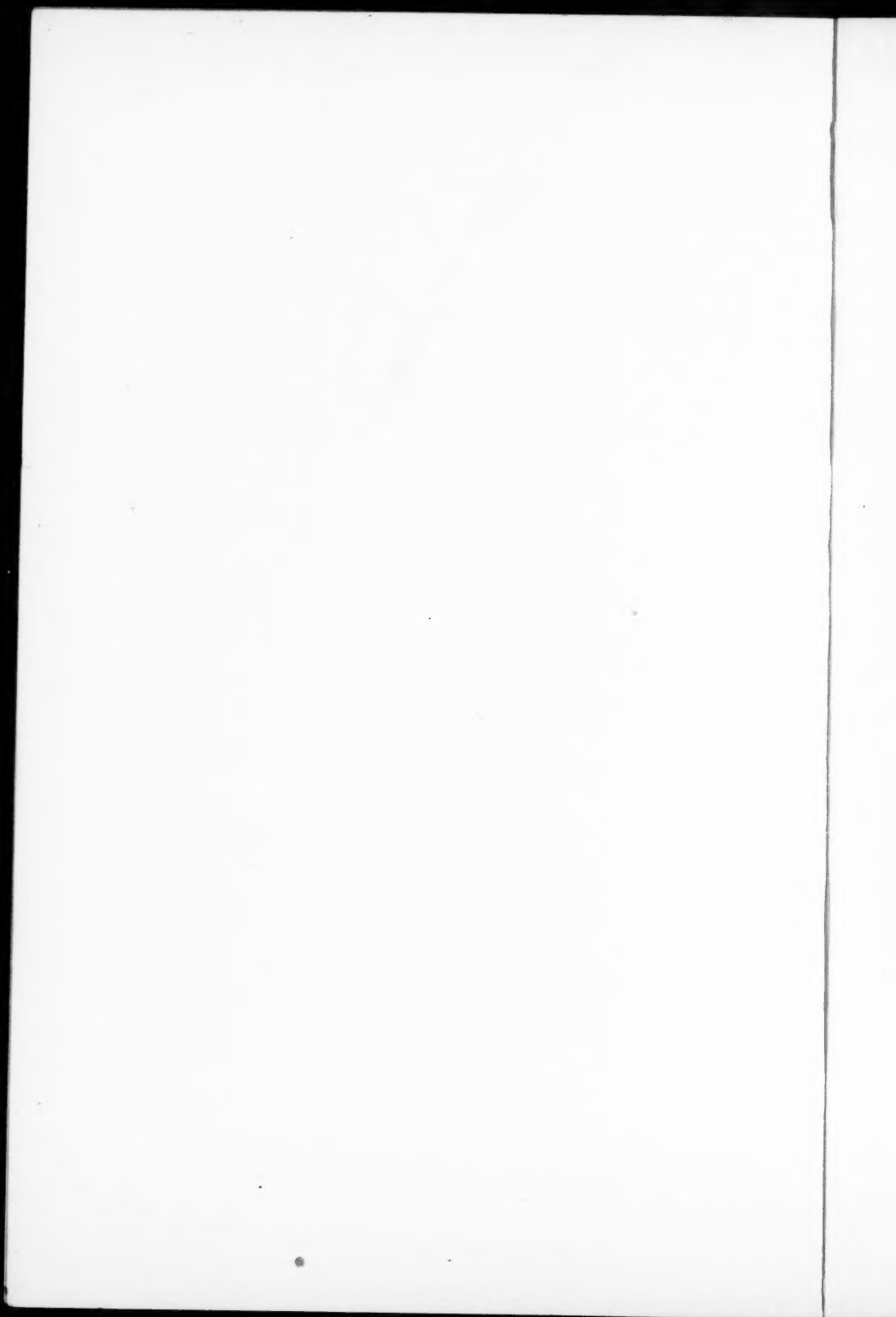
ber of Deaths

nt of Claims

graph below shows the incidence of deaths according to the date of death, which is recorded
 every day, and each of the spaces. The number of deaths is recorded on the side lines
 death, which is the space. It will be noted that the first peak of deaths is recorded
 on the week ending Oct. 26th. From that time the deaths declined to 10 in the week
 of Nov. 16th. There was a second, but not so high, ending Dec. 14th when the deaths
 were 14. There is a third top in the week ending Jan. 11th and 12th, and a fourth top
 in the week ending March 1st to March 22nd.

rawing line shows the face amount of the policies which became eligible by reason of
 death from influenza, arranged according to the date of death. Each of the squares
 each day. The number of policies which became eligible was 21,000 in the week
 ending Jan. 11th and 12th. It is evident that the maximum number of
 policies which became eligible was 21,000 in the week ending Jan. 11th and 12th.
 The two lines show a very close parallel, each other quite closely together.
 the bottom line of amplitude shows a third top in the week ending Jan. 11th
 and 12th, and a fourth top in the week ending March 1st to March 22nd.





Discussion—Recurrence of Influenza 71

in the opinion, from my own experience, that the masks were efficacious.

Dr. H. B. Anderson—In discussing the pneumonia accompanying the influenza epidemic of last year it seems to me sufficient emphasis has not been placed upon the fact that a similar cyanotic type of pneumonia was prevalent the year preceding the outbreak. It has been shown pretty definitely by MacCallum, Cole, and others that this type of pneumonia is associated with the streptococcus, and that the incidence of the pneumonia as well as the fatalities from it were much greater among streptococcus carriers than among non-carriers.

This is a matter of importance from the insurance standpoint, viz.: what our attitude should be toward persistent streptococcus carriers with clinical evidences of chronic focal infection in the teeth or tonsils. Are we warranted in accepting them, or if not what course should be taken? It is not known definitely what organism is accountable for influenza, but so far as investigations have gone they have pointed to pneumonia and other complications. These foci of chronic streptococcus infection therefore cannot be regarded as negligible. Another point with reference to the distribution of the influenza epidemic, we know that before its onset in the autumn of 1918, there had been local outbreaks in different parts of the world. A few days ago I met a clergyman recently returned from China who said that in 1917 there was a form of epidemic infection in that country which appeared to be identical with the one which swept over this country last year. There was also an outbreak in the Philippines, on the western coast of this continent, and in Cuba, as well as in different parts of Europe, before the great outbreak in September, 1918. In other words there existed widely separated areas of influenzal infection in different parts of the world which served as centers from which the disease radiated. Dr. Fisher has referred to the increased prevalence of pneumonia of the influenzal type preceding the outbreak of the great epidemic, a statement which I can corroborate as I saw a number of such cases in 1917 identical in all

their clinical features with the cases occurring in 1918. The Imperial Life Insurance Company had 220 death claims resulting from the influenza epidemic, the average age of the claimants being $32\frac{1}{4}$ years. An interesting point was that there were twice as many deaths among overweights as among underweights, viz.: 34% and 15% respectively. Though the number of cases is too small to warrant conclusions, it was interesting to note that 30% of our deaths were among those giving a history of more or less alcoholic addiction which would probably point to this factor having had some effect in increasing the death rate. We had four cases of death from pulmonary tuberculosis following influenza infection.

Dr. Beckett—In Los Angeles we did not use masks. I was appointed by the Mayor as one of a committee to take charge of the epidemic. We got most excellent reports from San Francisco as to the use of the mask, but I am told that in each case they put on the mask after the epidemic had reached the peak and had started down. The health officer was very careful, it seemed to us in Los Angeles, to wait until the peak was past.

The drop in Los Angeles was as sudden without the mask as in most other places where the mask was used. I visited a number of towns that were claiming most excellent results from the use of the mask. In no one of these towns did I find the mask universally or properly worn. In one town they had passed a law that a mask should be worn, but did not say how it should be worn. I saw some wearing it properly, others wearing it about the neck, others tied to the arm, while others had the mask protruding from their pocket. This town also claimed most excellent results from the wearing of the mask. In one town the policemen carried a supply with them and would sell them to the people on the street.

I believe, as in other contagious diseases, that the physician visiting the sick room should put on a gown, rubber gloves, and a mask, and take every precaution that he would in visiting a case of scarlet fever or diphtheria; that the attendants on the cases of influenza should do likewise and that every precaution

Discussion—Recurrence of Influenza 73

should be taken to prevent contracting the disease and carrying the disease to others.

In Los Angeles we quarantined the houses, closed the theaters and all public gatherings as far as we could. Our results compare very favorably with any of the cities of like size.

The wearing of masks kept many people off the streets and from public gatherings and in this way doubtless did much good.

In Los Angeles serum was administered free of charge by our health department. Only a small percentage, however, availed themselves of this treatment. Just how much good was accomplished by the use of serum, we have been unable to say. I believe the serum treatment is along the right line and doubtless the records of many of our large hospitals will give us valuable information for our future guidance.

Dr. Symonds—At the last meeting, a year ago, Dr. Russell very kindly, read a paper of mine on the results of influenza affecting the weights, alcoholics, and others. I want to say that I checked up those results with our additional experience, of something more than double the preceding record, and they are all perfectly accurate. The conclusions which were drawn then with regard to the influence of overweight, of underweight, of tuberculous family history, of alcohol, etc., are all the same, with one exception, and that is the age at death has been steadily increasing since that last quarter of 1918. There has been noticeably an addition of two or three years to the average age of influenza deaths, for each subsequent quarter.

Dr. Rockwell—I am sure that the discussion has been very interesting and very profitable to us all. Dr. R. A. Fraser will report on the "Availability of Statistics and the Present Status of Information as to Gassing and Shell Shock."

REPORT OF AVAILABILITY OF STATISTICS AND
PRESENT STATUS OF INFORMATION AS
TO GASSING AND SHELL SHOCK

BY ROBERT A. FRASER, M.D.

Medical Supervisor, New York Life Insurance Company

Several months ago I felt highly honored when asked to prepare a paper on the possible effect on mortality caused by battle casualties from the use of gas in warfare and from war neuroses commonly but mistakenly known as shell shock. It was my intention to present to the Association a series of statistics on the effect of gas on various groups, such as the class of lightweights, the class with tubercular family histories, and the class with personal histories of various pulmonary complaints, for purpose of comparison with our usual standards, so that we could arrange for extra mortality based on this study, as well as arrive at some time limit where the extra mortality rating could be safely removed.

A series of questions were formulated and presented to officials in charge of the statistical departments of the various allied governments, as well as visits to Washington to keep in closer touch with results.

I regret to report that it is impossible at the present time to present any statistics at all. None of the various governments are as yet in a position to afford us information of any value.

In Washington I was informed that the records would not be available for at least nine months or one year. The British and French governments are two years behind in their statistical work. The Canadian records covering the same period as that of the British and French are also unable to furnish the information needed for probably eighteen months.

A report on the gas experience of the American Expeditionary Forces, covering statistic histopathology, chemistry of gases, etc., is being prepared by officers attached to the chemical warfare service of the Surgeon General's Office, but it will not be ready for several months.

Fraser—Gassing and Shell Shock 75

As there was no data to work upon, I notified Dr. Rockwell, the President of the Association, that it was impossible to report on this subject, but it was felt that a few of the interesting points should be brought before the Association, and an opportunity for discussion given, in view of the fact that we are continually meeting with cases who report gas casualties, and because it was felt that the period over which extra mortality would be felt would not extend beyond a period of five years.

Chemical warfare is not new in history's page. *Aeneas*, 360 B.C., mentions burning of such substance as pitch, sulphur, tow, and resinous woods placed in iron pots in such a position that the enemy would be forced to breathe the fumes so generated. Greek fire was used as late as the Crusades, when it was employed by the Turks against the Christians. The Chinese are known to have used a weapon known as the "stinkpot." As late as the time of the Boer War, protest was made to the British Government against use of Lyddite shell, which was said to produce suffocation, although this was not the prime motive of the shell.

As far as is known, the gas attack has not been used in warfare since the Crusades for its own value. Consequently we all remember the horror that passed through the civilized world when in April, 1915, we heard of the cloud of suffocating green gas that was loosed on the Canadian and French lines, and we afterwards found that the unprotected and unprepared troops showed deaths from this cause of thirty-five of every hundred engaged, as compared with twenty to twenty-five per one hundred killed by bullets and high explosives, and two crippled for life. However, when the first surprise and horror had passed, means were taken to counteract the effects of gas attacks, and gas masks came into use and foiled the use of the first used gas, other gases were tried, and gas masks to meet the newer terrors of more potent gases were invented. In the latter part of the war both American and British officials agree that only three or four per cent. of fatalities occurred, of each hundred gassed. How great the

number of battle casualties were may be imagined when we hear that during the time of trench warfare, France and England report that gas cases accounted for fifty per cent. of all the casualty lists. American experience over the shorter period in the trenches varied from thirty to fifty per cent. When open warfare began, our gas casualties were reduced below ten per cent., yet our gas cases accounted for about 87,000 men, or thirty per cent. of our total casualties.

Most of these cases were affected by di-chlor-ethyl-sulphide, or mustard gas, which, while being credited with a low death rate, is regarded as king of poisonous gases on account of the disablement of the affected men who are thus put out of action for a considerable period.

GASES USED

1. *Chlorine*. Commonly called drift gas, trench gas, cylinder gas, green gas, or cloud gas. Was discharged from large cylinders kept ready in trenches awaiting a properly directed wind of from four to twelve miles per hour. It was used on a comparatively wide front, from three to five miles, and produced intoxication six miles behind the lines.

2. *Phosgen*. Is chief of all the many gases and liquids used for their effects as pulmonary irritants or suffocating gases inhaled as gases or vapors. Others of this group are Diphosgen and Oxychlorcarbon. All these lethal gases have chlorine as base. They may cause some watering of the eye, but the chief effect is catching of breath or choking sensation. Coughing and vomiting follow and then, after a delay of time varying from a few minutes to a few hours, an inflammatory reaction appears in the lungs themselves with the development of an acute oedema that progresses rapidly. Four fifths of all deaths occur in twenty-four hours. If the patient can be tided over this interval, he usually recovers, the oedema clearing in a few days, but cardiac dilatation may be present for several weeks. Usually three stages are noticed: (1) Asphyxial, (2) Quiescent, and (3) Bronchial. In bronchial

stage cough is severe and in practically all cases dyspnoea is marked, thick muco-purulent discharge is also noted, and these symptoms are found still present many months after attack had occurred. A few cases noted as cured tuberculosis and asthma returned to former condition, but few cases of tuberculosis are demonstrable as due to gas poisoning.

3. *Tear Gases—Lacrimators.* Tear gases are bromine compounds (acetone, xylene or, benzene bromide). These gases act immediately, causing a copious ocular irritation, intense lacrimation, and thus a temporary indirect functional blindness. They are commonly employed in gas chambers for purposes of instruction, and to test out the "fit" of a mask.

4. *Sternutators* (diphenylchlorarsin). The symptoms produced by this type of gas are immediate sneezing, coughing, headache, salivation, vomiting, and substernal pain. They are employed preliminary to or early in a gas attack so as to render gas-mask protection difficult or impossible. A man who is seized with the above-mentioned symptoms generally finds it impossible to get or keep his mask on, and hence falls a victim to the lethal gas that accompanies or follows the initial dose.

5. *Mustard Gas.* $(C_2H_4Cl_2)_S$, or Yperite, or di-chlor-ethyl-sulphide. Used first in July, 1917. Is spoken of as a vesicant, is contained in shells, and may exert its irritant action as a vapor in low concentration in the air or by direct contact from splashes of the liquid. The gas penetrates the clothing and slowly exerts its continuously irritant action on the body. This gas vaporizes slowly and may be found in shell holes and under the leaves and around the bases of trees, in cool, damp weather, ten days after the shelling occurred. Victims present a clean-cut clinical picture characterized by conjunctivitis with excessive lacrimation, laryngeal or bronchial irritation, and superficial burns. No immediate effects of the gas are noted, and practically no deaths occur within thirty-six hours, but may occur weeks later from broncho-pneumonia and secondary infection. Severely gassed patients, that is, those who have developed a demonstrable bronco-

pneumonia, usually die. The slightly gassed patients usually recover. About 80% of gas cases were ready to return to duty in one month. There is, however, a middle class in which bronchiectases develops in time as a result of cicatricial changes, but observers state that true tuberculosis as a sequel does not occur. Mustard gas seemingly spent itself in the upper air passages and did not reach the bronchioles and alveoli. It either did not reach them or in such a diluted or changed state that chronic pulmonary lesions after this gas were rare. Pathologists whom I interviewed state that only in a small percentage of the cases classed as severely burned bronchiectatic changes were noted, other findings were thickening around the bronchial tubes, while areas of the lung showed degenerative pneumonias through which areas connective tissues were slowly developing, resembling somewhat the lung changes in fibroid phthisis. A peculiar but not understood fact was noted, that microscopic slides taken from cases of influenza-pneumonias and from mustard-gassed lungs were so similar under examination that trained observers were unable to distinguish one from the other. In cases where healed tubercular lesions were found, it was noted that no new evidences of a reinfection or breaking down were to be seen. This study covered about one hundred cases.

Reports of French observers indicate that they are disposed to believe that men who are gassed become a ready prey to tuberculosis, but both the British and American observers deny this. The report of the Rockefeller Institute Committees who investigated the tuberculosis situation in France stated that after considerable study they were unable to verify the belief of the French observers, that tuberculosis was a sequel of gas poisoning.

I believe it will be possible to look upon the majority of cases gassed since 1917, whose hospital record was under one month and who are now of normal weight, as one of a class who has suffered from a severe bronchitis. Cases gassed prior to 1917, subjected to chlorine or phosgen gas attacks, must be carefully examined, and preferably be subjected to

fluoroscopic examination on account of the very considerable lung changes reported in practically all of these cases.

I am indebted to Lt. Col. A. A. Fries, to Lt. Col. G. A. Morris, and to Dr. J. H. Elliott, Dr. Tovale, and Dr. Pappenheimer for their advice and the use of results of their observations. I wish to quote a statement contained in Lt. Col. Fries' reports—"Gas warfare will continue because it is humane and because it will produce casualties with less expenditure of ammunition than any other form of attack. Moreover, it can be used almost anywhere at any time. The only places in the past war where it was not used were in submarines and in the air. So great, however, are its possibilities that it is not believed these two methods of warfare will escape in another contest."

SHELL SHOCK

What has been related in connection with the lack of information on statistical lines concerning gas casualties refers even more so to this large group of battle casualties known as shell shock.

To most observers this term is the proverbial red rag to the bull, and one is continually interrupted and corrected by the expression, "No, no, you refer to war neuroses."

However, the term still sticks in spite of the fact that it was at one time thought of doing away with the term "shell shock," with its implication of organic injury, which impresses the mind of the patient and public alike. Efforts have been made to have it generally known that shell shock is an essentially curable condition.

The mistake that appears to be made, even by the observers themselves, is that they fail to differentiate between a commotional shock as against an emotional shock.

They do admit it in certain of their classifications of the term, concussion cases, but the majority of them still include this group among the neuroses.

The commotional group is not a large one, but apparently the brain itself is injured. These cases may not show out-

ward signs of injury, but various methods exist for differentiating them from the emotional shock. For example, the cerebro-spinal fluid when examined would be found to contain blood and albumin, or the drum of the ear might be found ruptured. Post-mortem examinations in such cases have shown microscopic hemorrhages in the brain.

At any rate the early reports from the battlefields of large numbers of men found dead without evidence of wounds has not been borne out by the facts in the case, but the stress laid upon this erroneous information has left us with the term, shell shock.

An English observer insists that the term might better be expressed as shell shy.

There is now an essential agreement of opinion that the great bulk of the cases are functional and that it is possible to prevent many of them, and that even when of long standing and fully developed they are curable.

War neuroses do not develop on account of the increases in number or intensities of explosives, as they develop after gassing, after machine-gun fire, and oftenest when there has been no direct exposure to firing at all. They develop in base hospitals, and all the symptoms quoted as war symptoms have been observed in large numbers in home cantonments during the training period.

Patients entering army neurological hospitals were divided into four classes:

1. Those in whom there have already developed hysterical phenomena, such as aphonia, deafness, blindness, palsies of the limbs, amnesias, and confused mental states.
2. Those which have developed well defined anxiety states.
3. Neurasthenias.
4. Psychasthenias, and
5. Those who are best described as examples of hypermotivity.

Besides these there are a small number of soldiers suffering from actual psychoses, a few cases of organic nervous diseases, such as epilepsy and mental deficiency.

The French and English report that nervous and mental casualties may exceed 10 per cent. The English experience is that 1915 and 1916 were the worst years, and that in 1917 one third of the unwounded and one seventh of the total discharges, including the wounded, were permanently unfit on account of functional nervous and mental diseases.

It is apparently the belief of all observers that hysteria and hysterical manifestations, such as unconscious states, amnesias, deliriums, aphonias, deafness, and transient monoplegias, take in the largest part of all cases known as shell shock.

Over 60% of the cases in this group of emotional shock, if we may call it so, were restored to health in ten to fourteen days, and it is believed that from 80 to 90% could be returned to the lines.

With the exception of epilepsy no single disease has been demonstrated as being an essential factor in causation of unstable equilibrium. "While we believe it goes without saying that a man with a previous history of unstable nervous system is more susceptible to the experiences of battle, there are many who present symptoms in whom there is no such history. They acquire in a short time a state of instability which in civil life would take months or years to develop. In 320 histories, 174 were negative as to previous nervous manifestations. In 146 there was a history of nervousness, nervous breakdown, nervous temperament, phobias, traumatic neurasthenia, chorea, fear of the sight of blood, frontal headaches, epilepsy, bed wetting, sunstroke, delinquency, dizzy and fainting spells, hysteria, and drug addiction.

"Previous occupation plays some part perhaps in rendering a person susceptible to the influences causing neurosis. In 327 case histories there were forty-six farmers, thirty-eight clerks, thirty laborers, eighty-five skilled laborers of various types, and four physicians. Family predisposition was observed in a certain number of cases. It was negative in 195 cases, and positive in 137 as to insanity, cancer, tuberculosis, or nervous manifestations in father, mother, sister, or brother."

Many of the conclusions on this article are based upon the observations of Colonel Pearce Bailey, Dr. John H. W. Rhein, and of Colonel Mott, of British Medical Corps.

CONCLUSIONS

These may be made only in a general way on account of the lack of definite figures, but enough has been learned to rid us of the fear that we were about to meet a rising curve in our mortality experience. In the gas cases, as I said before, we can afford to be lenient towards those of good build, good family history, and whose hospital records show early convalescence.

The cases of war neurosis, particularly those who early yielded to treatment by suggestion, of good family and personal history, we can also treat very leniently, but it is suggested that careful inspection be made, and that if applicants appear on pension lists on account of that, they be refused insurance.

Dr. Fraser—I regret the paucity of the remarks that were made in the report, and I had hoped that some addenda could be added to that report, but after having made a visit to see the authorities in Ottawa, and less than a month ago paying another visit to Washington, I came to the conclusion that we would have to wait until the Army and Navy Departments finish their work. At the present time none of the governments are in position to give any statistics that are worth while. To say that there were 80 or 90 or 200 thousand cases of gas casualties does not help anybody, so we will simply have to wait for probably two or three years before being able to present any report that is worth while.

The conclusions that I made at the end of the paper, both with regard to the gas casualties and the casualties known as war neuroses, are made up from the opinions of many men whom I have met and who have been in charge of hospitals that treated these various cases. Since I came here to-day,

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I have met my friend, Dr. Strathy, who has had some experience over in France, and I also understand that Dr. Archibald has had considerable experience, as well as my old professor, Dr. Anderson. I would be very glad if they would speak in connection with this report, but I am very sorry that I was unable to give any further information than that contained in the report.

Dr. Strathy—Mr. President, I had a few remarks prepared on the effect of war service generally on insurance risks, but I had not expected to speak on gas especially. The gases as we had them in service were practically three, from the point of view of serious casualties. The first gas employed was chlorine, and it was employed in 1915 and abandoned in 1916 because it was too dangerous to use when the shell fire became heavy. Chlorine, I think from an insurance standpoint, is probably the most serious gas. I arrived in England a few days after the second battle of Ypres and from then on, during the first four months that I was in England we had men, two and three months after being gassed with chlorine, showing damage in their lungs. The worst cases were those who gave a previous history of bronchitis. Those who had had no damage to their lungs before, had healthy lungs, in nearly all cases had no permanent disability and no permanent impairment as insurance risks. A very small percentage of chlorine gas cases did have some impairment. Practically no men in the American army got chlorine gas, and a very small number in the Canadian army, and a comparatively small number in the British army, so that it is not a very strong factor. It was only used against us from April, 1915, to June, 1916, when the British, getting a better supply of munitions, their shell fire became so heavy that the Germans could not use the chlorine gas.

Phosgene gas was brought out in the summer of 1916, in the fighting on the Somme. One of the disadvantages of phosgene is that unless a man gets a severe dose of it he does not notice it at the time. Phosgene is the most rapidly fatal of all the gases. A man would get a dose of phosgene gas, walk back to his billet, perhaps three or four miles, and be found dead

in an hour or two. His symptoms were often very slight, apparently cardiac. The phosgene gas cases do go on to some extent affecting the lungs and bronchi, but I never saw a case of bronchitis which lasted over four months, from phosgene gas, where there had not been a previous history of chronic bronchitis or asthma.

The third gas, not really a gas at all, commonly called mustard gas, is a heavy liquid which is floated out of the shell-burst on chloroform vapor. The importance of it as a gas, from the casualty point of view, was that the mask while it protected the lungs did not protect the men's bodies. Phosgene cannot be used in damp weather, and is very soon broken up when it reaches the mucous membranes because of the moisture. Mustard gas is soluble and is very soon caught in the mucous membrane. But the gas discipline in all the armies was so strict and so good that, with the proper helmets and with the strict discipline in force, the men putting on the masks with the first alarm, the respiratory dangers became very small, and most of the gas casualties, in the last year of the war—not the deaths—were due to burns, especially of the axilla and the groin, and so on, wherever moisture collected. Some of the most severe cases were those where the men had sat down in a place where a gas shell had burst.

I was in a hospital in England the whole year of 1918. A very large number of gas cases came through, and we had altogether two or three deaths—that would be in certainly over 1000 cases. I do not remember ever invaliding a man for gas-sing, so that from the insurance point of view I do not believe that gas as an insurance impairment, apart from chlorine gas, is important, where there has not been a previous history of bronchitis, and even this is only aggravated, and that man is not likely to be a good risk anyway. So far as the chlorine gas is concerned the cases were very rare, because so few men were exposed to it.

Now you would wonder how men with chronic bronchitis would be in the army. Men with chronic bronchitis were not in the fighting branches, such as the artillery and the infantry

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and so on, but they were in the labor companies. They had to be used when the man power decreased.

There was one thing in connection with phosgene gas which interested me in France. In the operating rooms, when using chloroform with gas jets burning the patients were being poisoned and bronchitis produced. On investigation, it was found that this was due to the chloroform being broken up into phosgene, and just a few months later the Germans sent over their phosgene gas.

At the time of the armistice there were 40,000 casualties from gassing in the British hospitals. In talking with Colonel Saltan, the consultant in charge of gassed cases, he told me, and my experience agreed with his, that 30,000 of those men were absolutely fit as regards their chests, the whole trouble being that the gas was the final factor in producing a neurosis. The men were pretty well exhausted, the previous years of fighting were heavy, the nerves of the army were very bad, and the slight gassing was just enough to determine a neurosis, so that nearly all of those men—thirty out of forty thousand—were absolutely cases of neurosis. In this insurance history a man will very often say that he was in the hospital for gassing for three months when, as a matter of fact, he was in the hospital until his burns healed or until his slight bronchitis cleared up, and the rest of the time he was in the hospital on account of his nervous condition.

With regard to shell shock, this has been described as emotional and commotional. Commotional shell shock resembles more closely linear fractures of the skull. Commotional shell shock is extremely rare. I saw actually thousands of cases of so-called emotional shell shock which should not be called so because emotional shell shock is not shock in the way of physical shock. It is an exhaustion neurosis. I think I can sum up my opinion in regard to shell shock, judging it for insurance work, in this way: Judge it as you would neurasthenia, remembering that the importance of shell shock varies with the extent of the exposure, that is, the severity and the duration of the exposure. Any man, if he stays long enough in front

line work, will come to nervous exhaustion. If on the other hand a man gets into the front line, or even doesn't get as far as the front line, and gets his shell shock when the first two or three shells land about him, he is of a low nervous stability and therefore you must judge him as a case of low nervous stability with the dangers of suicide, insanity, etc. If a man goes through a very trying experience that of course is somewhat equal to a longer duration of his exposure. The third thing on which I would judge a man with a history of shell shock is: What was the result of his shell shock? Did his symptoms last long after he was affected? Taking these as a basis, I think you begin to get an idea of the type of nervous disposition of the man whom you are trying to judge.

Dr. Archibald—I really have nothing to add except to corroborate what Dr. Strathy has said, from what small hospital experience I have had in connection with these cases. On my return from France, in January, 1917, I was placed in charge of a hospital in Canada. We did have some cases admitted that were sent out from England as "gassed cases," but these were mostly as a result of chlorine gassing, which had produced conditions causing the men to be unfit to go back again to the line. Many of the cases were really cases of chronic bronchitis. Some of them showed marked emphysema; and X ray of the chest also frequently disclosed thickening of the bronchial tree. The majority of these cases exhibited definite evidence of chronic bronchitis which could be detected on any insurance examination. A certain number of the so-called "gassed cases" were really neurotics and exhibited only subjective symptoms. These men were successful in being sent back to Canada during the earlier stages of the war, when our man power seemed to be ample and when such cases were dealt with leniently.

With regard to the cases of war neurosis, as Dr. Strathy has pointed out, the period during which the man has suffered from neurosis is a very important factor in estimating the insurance value of his risk. There is one exception that I would like to take to this, and that is the case of men who succumbed

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to this trouble during the earlier period of the war at a time when even our psychologists and psychiatrists did not quite understand the true significance and the proper treatment of so-called shell shock. In these earlier times many men were evacuated to hospital and then sent to convalescent homes, where they stayed for many months and were well cared for and happy, and there was no real stimulus to assist them in getting well, in fact quite the reverse as cure might mean the return to the front. Perhaps this is rather hard on the psychologists and psychiatrists, but it is nevertheless a fact. I think Dr. Strathy will agree with me that latterly these cases were cured much more rapidly, in fact frequently a cure was effected at the first sitting.

As to physical disabilities which shell shock produces, I do not think that any better estimate of this condition can be given so far as affecting insurance is concerned than to quote an Order in Council of the Government of the Dominion of Canada passed in 1917, which was to the effect that no case of shell shock was to be discharged from the service until *cured*. The reason for this was that many men were being discharged and receiving a pension for a disability which in reality did not exist but was merely a functional psychosis.

I think in so far as length of service is concerned as a factor in producing shell shock, that Dr. Strathy's remarks are very potent, with the exception that not infrequently a man going into the line for the first time, if he were unfortunate enough to be partially buried and had to be dug out might at once succumb to shock. The fear of being buried alive was one which, in my opinion, was greater with most men than the fear of death from any other cause.

I do not think there is anything further that I can add. So far as the acceptance of these risks is concerned I believe that we can safely take applicants with a history of having been gassed if they are able to pass a satisfactory physical examination by a competent examiner.

Dr. Martin—This is quite unexpected, Mr. Chairman, as I had not anticipated being called upon.

I was quite interested to hear Dr. Strathy's communications on the war diseases, with reference to life insurance.

Referring to his classification of the war neuroses, I was reminded of the very epigrammatic scheme adopted in France, which one may remember without very much trouble. There are three types of these war neuroses,—first, those that resulted in a definite shock from being blown up; second, those with paralysis of various kinds, the so-called conversion hysteria; and third, those that are malingerers, and more or less fakirs. We were in the habit of classifying these three groups as the blown-ups, the wind-ups, and the fed-ups. The classification has, at least, the advantage of being epigrammatic.

Dr. Strathy will bear with me when I say I was a little surprised at his very lenient interpretation of the ultimate findings in the mustard-gas cases. Certainly, from my own observations in France, there seemed to be a fair proportion of cases in which the resulting lesions were very severe; lesions in which the end results were chronic bronchitis and bronchiectasis, while in others there were cases of abscesses in the lungs and similar complications. Any one of these conditions would seriously impair the risk from the insurance point of view. I feel that we are very much indebted to Dr. Strathy for his very lucid account of the various types of gassing which came under his notice, and which has been a most illuminating one for the meeting.

Dr. H. B. Anderson—I saw a comparatively small number of "chlorine gas" cases among Canadian soldiers invalided after the first gas attack at the second battle of Ypres. As these cases had not had the protection of gas masks they differed in some respects from those occurring later on in the war. Many of them showed marked gingivitis and inflammation of the structures of the throat, apparently due to the local irritant action of the gas. In a number of cases which we had at the Central Military Hospital, Toronto, there seemed to have been a latent tubercular infection lighted up; others suffered from persistent bronchitis as referred to by Dr. Strathy, in which the X ray showed at times peribronchial

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thickening, in other cases bronchiectasis. In some cases where an apparent cure had taken place the individual complained at intervals of a sense of constriction in breathing, especially when in a closed room. There is undoubtedly in some cases a tendency to recurrent attacks of bronchitis. Where the applicant's general condition is satisfactory, and where all the symptoms have disappeared for one or two years, I believe such cases can be considered as standard lives.

Dr. Rockwell—Are there others who will favor us by their discussions?

Dr. Jaquith—Do you think those who have been gassed are more susceptible to respiratory diseases—especially the acute respiratory diseases?

Dr. McCulloch—I had an experience in the early part of the American participation of about 600 cases, which were exclusively cases of mustard gassing, and I am very positive in my own opinion that a man that has had any inhalation of mustard gas to any degree whatsoever is exceedingly susceptible to subsequent respiratory affection. I saw a fair number of these, with the most profound and deep-seated ulcers of the mucous membranes, the trachea, and the bronchi, and I cannot possibly see how such cases will ever be 100% normal after that, and I would feel inclined to scrutinize with exceeding care the case of any man who gave a history of mustard gas poisoning, in which there was a record of any symptoms of inhalation of the gas. I think we will hear afterwards of an increased mortality in the inhalation cases.

Dr. Rockwell—I would like to ask Dr. Strathy if he thinks there ought to be a probationary period in the case of a man who had inhaled gas after the absence of all signs perhaps, whether he would be a safe risk to take, say after a year, with no signs since, and no signs on examination? How would you feel about him as a risk?

Dr. Strathy—It is quite true that men died of pneumonia from mustard gas, but in my experience when a man did not die he recovered completely. I saw those men in all stages, I think. I saw them at the Casualty Clearing Stations where

they were desperately ill and I thought they were doomed, but they lived; and then I had a year's experience seeing them at later stages. I was astonished that they were not coming back with bronchitis afterwards, but they recovered—excepting those with very serious lesions—and my experience covered two years after the introduction of the mustard gas. I had one man, apparently a case of chronic gas poison, who died in the "flu" epidemic, and we found that he had an old tuberculous cavity.

Another point that Dr. Anderson referred to. I am not quoting from my own experience alone but from French and British reports up to the end of 1918, when I say that I do not think that gas poisoning tends to bring out a latent tuberculosis.

I think that every man with a history of gassing should have a long period of probation, but if a man's lungs are now clear and have been clear for a year following the gas poisoning, I think the danger is very small.

Dr. Whitney—I might give a few facts, having been able to follow some of the men I had seen shortly after they were gassed. I had perhaps a rather peculiar and interesting service, in coming in close contact with about 6000 men, and having seen a number of them since they returned to the States.

It is interesting that a good many of these men who were seriously gassed show no signs whatever upon physical examination. The thing that interests us now is, how we are going to pick our cases, and whether we can pick them.

I think a thorough physical examination is the only guide we have to go by, and if a man is in good physical condition now, heart and lungs, he is safely insurable. The men that were badly gassed died. The men that got over the first few days of hard time recovered. The testimony as to tuberculosis following gas attacks, both by English and French authorities, agrees that there has been no predisposition to tuberculosis in their experience. We had to take their word for it. I came more closely in contact with the French, and that was the result of their experience.

Some of the doctors have wondered about the effect upon

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the heart and circulatory apparatus. I think if a man's heart is in normal condition now, he is safely insurable.

Another thing we must bear in mind in these histories of men having been gassed. There was a premium put upon being gassed in the A. E. F. If a man was gassed or wounded so as to require the services of a physician, whether he went to a hospital or not, he was entitled to wear a wound chevron. In the army a man, when he was gassed, was badly gassed. Now, when he is applying for insurance, and we question him and examine him, we find that he was not gassed so badly, after all.

As to the neurotic cases, I have felt that a good many of those shell-shock cases were "nuts" before they went into the army, and the neurosis cases will have to be decided about as we have decided all cases that have had neurasthenia.

Dr. Rockwell—I am sure we all feel that this has been a very interesting subject, notwithstanding Dr. Fraser's beginning modesty which he has continued to this meeting, in that he felt he could not bring a subject of great and vital interest to us. I think it has been one of great and vital interest, and I wish to thank him and particularly the Canadian representatives who have taken part in the discussion.

This brings us to the end of our session for to-day. Adjournment to-day, however, does not mean the adjournment of the Medical Directors' Association, but I wish to thank each one of you for coming, and to thank you for the spirit in which you have entered into the discussions of these various papers, and I only hope that you will get as much benefit out of them as I certainly have. We will meet to-morrow with the Actuarial Society at the Hotel Astor, at 9.30 o'clock A.M.

On motion, the meeting adjourned.

In the minutes of the Executive Council, adopted by the Association, it was recommended that the following paper be read by title and incorporated into the Proceedings of the Association:

BLOOD PRESSURE AS AFFECTED BY SEX, WEIGHT, CLIMATE, ALTITUDE, LATITUDE, OR BY ABSTINENCE FROM ALCOHOLIC BEVERAGES

BY ARTHUR HUNTER, F. F. A., F. A. S., AND OSCAR H. ROGERS, M. D.

This study is based on the record of blood-pressure observations made in connection with the examination for insurance of residents of the United States and Canada. The observations were made during the years 1913 to 1916, inclusive, and all of the cases were accepted on standard plans. The blood pressure among those who paid for their policies was found to be the same as among those who did not do so.

Only the systolic pressure is considered for the reason that, as physicians generally have not yet learned the technic of taking the diastolic pressure, a comparatively small proportion of the material gave diastolic readings, and of these some were evidently inaccurate.

SEX

An analysis of 62,000 blood-pressure readings on men, and of 5,000 on women, yields the following results:

TABLE I

Ages	Men	Women
15 to 19.....	120	117
20 to 24.....	122	118
25 to 29.....	123	119
30 to 34.....	124	121
35 to 39.....	125	123
40 to 44.....	127	125
45 to 49.....	129	128
50 to 54.....	133	132
55 to 59.....	134	134

Hunter-Rogers—Blood Pressure 93

These figures have not been graduated or smoothed out and, therefore, give strong evidence that the data at our disposal were sufficient to produce dependable averages. It will be noticed that the average blood pressure of women at the earlier ages is 3 or 4 mm. lower than that of men, and that with increasing age the difference between the sexes decreases, until at age 60 it disappears altogether.

It is interesting to note that the average systolic pressure of men, as determined in this study, is almost exactly the same as that brought out in the investigation of this subject by the Association of Life Insurance Medical Directors.

ALTITUDE—LATITUDE

In this study the data for men were divided into three geographical groups:

1. The United States, exclusive of the Rocky Mountain region.
2. The Rocky Mountain region.
3. Canada.

TABLE II—MEN

Ages	United States, Exclusive of Rocky Mountain Region	Rocky Mountain Region	Canada
15 to 19.....	120	118	120
20 to 24.....	122	122	122
25 to 29.....	123	123	124
30 to 34.....	124	123	123
35 to 39.....	125	125	125
40 to 44.....	128	125	127
45 to 49.....	129	126	129
50 to 54.....	133	132	133
55 to 59.....	134	132	134

These results suggest that within the temperature zone neither altitude or latitude has any material influence upon blood pressure.

ABSTAINERS, NON-ABSTAINERS, OVERWEIGHTS, UNDERWEIGHTS

In this study it was found necessary to subdivide each of the groups, abstainers and non-abstainers, according to weight and sex. In the group of normal weights we included all those less than 15 per cent. over or under weight; among the underweights those 15 per cent. or more under the average weight, and among overweights those 15 per cent. or more above the average weight. In some of the groups, by reason of the small amount of data available, particularly among women, it was found necessary to remove irregularities by a process of rough graduation. The graduated averages are presented in the following table:

TABLE III

AVERAGE SYSTOLIC BLOOD PRESSURE AMONG ABSTAINERS AND NON-ABSTAINERS DIVIDED INTO WEIGHT GROUPS

Age	ABSTAINERS, MEN			NON-ABSTAINERS, MEN		
	Under Weight	Normal Weight	Over Weight	Under Weight	Normal Weight	Over Weight
15 to 19. . .	118	120	122	118	120	122
20 to 24. . .	121	122	124	121	122	124
25 to 29. . .	122	123	125	122	123	125
30 to 34. . .	123	124	126	123	124	127
35 to 39. . .	123	125	127	123	125	128
40 to 44. . .	123	127	129	123	127	130
45 to 49. . .	125	129	131	125	129	132
50 to 54. . .	128	131	133	129	132	135
55 to 59. . .	131	132	134	132	134	137

Age	ABSTAINERS, WOMEN			NON-ABSTAINERS, WOMEN		
	Under Weight	Normal Weight	Over Weight	Under Weight	Normal Weight	Over Weight
15 to 19. . .	114	116	117	114	116	117
20 to 24. . .	117	119	120	117	118	120
25 to 29. . .	119	120	121	119	120	121
30 to 34. . .	120	121	122	120	121	123
35 to 39. . .	121	123	124	121	123	125
40 to 44. . .	122	126	127	122	126	128
45 to 49. . .	125	129	130	125	129	130
50 to 54. . .	128	131	132	129	132	133
55 to 59. . .	131	132	134	132	134	136

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A study of this table shows clearly that the blood pressure is lower than the average among underweights and higher than the average in overweights. Dr. J. W. Fisher found among "accepted" risks, whose weight exceeded the average by more than 20 per cent., the following:

Age Group.	Average Blood Pressure
Under 40	127
40 to 44.....	132
45 to 49.....	135

These figures are slightly higher than our own.

There does not seem to be any difference between the average blood pressure of abstainers and of non-abstainers. Except in the overweight groups at the older ages, the differences may be accidental, due to a relatively small amount of data rather than to the use or avoidance of alcoholic beverages. A study of the weight distribution of abstainers and of non-abstainers shows that there is a larger proportion of overweight among the non-abstainers.

VARIATION OF BLOOD PRESSURE IN NORMAL PERSONS

As the blood pressure seems to vary considerably between persons of the same age in good health, a table has been prepared showing percentage distribution of the blood-pressure readings among men 35 to 39 years of age, inclusive.

TABLE IV

MEN AT AGES 35 TO 39, INCLUSIVE

Systolic Blood Pressure	Percentage of Data
Under 99.....	0.1
99 to 103.....	0.8
104 to 108.....	1.0
109 to 113.....	5.4
114 to 118.....	11.1
119 to 123.....	20.3
124 to 128.....	23.3
129 to 133.....	19.4
134 to 138.....	10.4
139 to 143.....	6.2
144 and over.....	2.0

The average blood pressure of men in this age group is 125. It will be observed that the great bulk of the readings are very close to this average. On the side of low blood pressure only about 2 per cent. of the data are more than 15 mm. below the average, and on the side of high blood pressure about 3 per cent. are more than 15 mm. above the average.

As bearing upon the question of accuracy of determining or of recording blood-pressure observations, an analysis of the figures as to the final digit was made with the following results:

TABLE V

MEN, AGES 30 TO 39, INCLUSIVE

Final Digit Used	Percentage
0.....	40.9
5.....	21.8
8.....	13.6
2.....	9.1
4.....	5.7
6.....	5.2
3.....	1.2
7.....	1.1
9.....	0.8
1.....	0.6

If blood-pressure readings were always made to the nearest millimeter, each one of these final digits would be employed as frequently as any other one. The preponderance of the choice of the final digits 0, 5, 8, 2 shows that many medical examiners probably read to the nearest even ten; that a smaller number read to the nearest five, and that a still smaller number in reading more closely select the final digit 8 or 2. It is curious that so small a number of examiners select the final digits 3 or 7.

NORMAL BLOOD PRESSURE

In October, 1911, Dr. J. W. Fisher of the Northwestern Mutual Life Insurance Company laid before the Association of Life Insurance Medical Directors the experience of his company with regard to the blood-pressure test. The following

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table shows the experience of the Northwestern Life and the New York Life side by side:

AVERAGE BLOOD PRESSURE, MEN		
Age	Northwestern Mutual Experience	New York Life Experience
15 to 19.....	118	120
20 to 24.....	124	122
25 to 29.....	126	123
30 to 34.....	126	124
35 to 39.....	126	125
40 to 44.....	128	127
45 to 49.....	131	129
50 to 54.....	132	133
55 to 60.....	134	134

CONCLUSIONS

With regard to the systolic blood pressure, we may say that:

1. It is slightly higher in men than in women at the same age.
2. It is higher among overweight persons than among those of average weight, and higher among the latter than among underweight persons.
3. It is apparently not higher among non-abstainers than among abstainers of the same age, weight, and sex.
4. It is apparently not influenced by moderate differences of latitude within the temperate zone.
5. A variation of 15 mm. below the average and of 15 mm. above the average seems to be within the limits of the normal.

SECOND DAY

The Association of Life Insurance Medical Directors held a joint meeting with the Actuarial Society of America, on Thursday, October 23, 1919, at the Hotel Astor, New York City. President Henry Moir in the chair. The meeting was called to order at 9.30 A.M.

Mr. Moir—The arrangements for this meeting have been carried out by a committee of six, three medical directors and three actuaries. The first pleasant duty I have to perform is to state that the committee has relieved the officers of both societies of a great deal of trouble, and I want to convey to them now and at once a hearty vote of thanks of the joint bodies. The committee consisted of Drs. Rogers, Willard, and Symonds and Messrs. Gore, Hunter, and Strong.

Motion was made and carried that a hearty vote of thanks be tendered by the members of both Associations to the committee in charge of the arrangements for the joint meeting.

Mr. Moir—We are here as joint officers in insurance companies. The actuaries do not often have opportunities to meet the medical directors in this way, and therefore we all want to talk to one another, whether we know one another or not, and in this way get acquainted.

I will ask Dr. Rockwell, President of the Association of Life Insurance Medical Directors, to say a few words.

Dr. Rockwell—Gentlemen: On behalf of the Association of Life Insurance Medical Directors, I desire to express the

pleasure it has given to us to meet jointly with you of the Actuarial Society to-day. The problems which the Medical Director has to solve are so closely linked at the present time with actuarial problems that it is to the advantage of both parties to work together as closely and as intimately as possible. You all remember Mr. John B. Lunger, one of your oldest members, whose idea and thought and wish was so frequently expressed that the two bodies get together and meet together frequently. The outcome of that was the meeting we had three years ago. All of us will remember the pleasure and profit we obtained from that meeting, and it is to be hoped that as time goes on the two bodies may become more closely related and may meet together more frequently. I hope that this meeting to-day will be as pleasurable as was our meeting yesterday.

Mr. Moir—We will now proceed to our regular business. There are no set addresses. The first paper that we propose to discuss this morning is that on the Numerical Method by Dr. Rogers and Mr. Hunter.

THE NUMERICAL METHOD OF DETERMINING THE VALUE OF RISKS FOR INSURANCE

By Dr. OSCAR H. ROGERS AND ARTHUR HUNTER

Those of us who believe in a numerical system of estimating the value of lives for insurance welcomed the publication in 1918 of the Joint Committee's report on "Standard Mortality Ratios Incident to Variations in Height and Weight Among Men," because it rendered accessible to all, foundation ratings upon which a scientific method of estimating the value of lives for insurance might be built up. Indeed these ratios, taken together with the material brought out in the Specialized, in the Medico-Actuarial Mortality Investigation, in the work of the Joint Committee, and in the various excellent studies presented through the Actuarial Society and the Association

of Life Insurance Medical Directors, give us abundant material with which to answer with reasonable accuracy most of the questions likely to arise in connection with the valuation of lives for insurance. Two companies have already established with these or similar data a complete system of numerical ratings by which they carry on their medical selection; still other companies have adopted the numerical system in whole or in part, and from the steadily increasing interest manifested in the subject we believe that the time is not far distant when the numerical method, or some other built up along scientific lines, will replace generally the old empirical method of selection.

The purpose of this paper is to describe briefly the numerical method, to publish the basic ratings of build and family history in such form as to be easily available, and to explain the use of these standards so that those who choose to do so may employ them in their routine selection, and thus lay in their respective offices the foundation for a scientific method of valuing lives for insurance.

Before doing so we should like, at the risk of being tiresome, to explain again briefly the numerical method and to state at some length its advantages and disadvantages.

BRIEF EXPLANATION OF THE NUMERICAL METHOD

Every risk for life insurance is found to be made up of the following factors:

1. Build (Weight in relation to Height),
2. Family Record,
3. Occupation,
4. Personal History,
5. Habits,
6. Physical Condition,
7. Habitat or Residence,
8. Moral Hazard.

And there is an additional factor which should be considered, namely,

9. Plan of Insurance Applied For.

The underlying principle in the numerical method of medical selection rests on the assumption that the average risk accepted by a company has a value of 100 per cent., and that each one of the factors which make up a risk shall be expressed numerically in terms of 100 per cent., and that, by the summation of them, or by some modification of their summation, the value of any risk shall be determined and expressed with relation to that standard. Everyone who passes judgment upon a risk carries out this process in his mind. He begins with the applicant's build. If the risk is distinctly over or under weight the impression upon his mind is unfavorable more or less in proportion to the degree of its departure from the normal with respect to that factor. He turns then to the family history, and, if this is an excellent one, his judgment is favorably influenced; if it is bad he makes a more or less definite addition to his first mental valuation, and his judgment up to that time is the sum of the two previous impressions. Taking up the next factor, occupation, his judgment of the risk is influenced favorably or unfavorably according to the nature of that factor, and so on through the entire case. Thus the reviewer carries on in his mind a process of addition and subtraction, or a modification of this process, according as each factor is favorable or unfavorable or negative, and his final judgment of the risk is the total of these various favorable and unfavorable impressions. The numerical method expresses each step in this mental process in terms of a definite standard and the final valuation of the risk, with comparatively few exceptions of material importance, is the sum of these various items. If the medical reviewer knows the insurance significance of the applicant's build, as determined by past experience of similar cases, he uses this value as a foundation to which he adds or from which he subtracts the effect, as determined by statistical studies, of the other factors in the case, family history, occupation, and so on. Wherever there is clear evidence that two factors are interdependent so that their addition is not sufficient or is distinctly too large, allowance is made for that interdependence.

All of these processes may be carried on by properly trained clerks, but where the numerical ratings as so determined bring a risk close to the border line, either on the standard or the sub-standard side of the limit which the company fixes in advance, or where purely medical factors require more detailed analysis, the risk is then a proper subject for expert medical study. Of course, there are other cases which require the attention of the medical selector or the actuary, cases involving technical medical knowledge, applications for large amounts of insurance, occupations which do not come clearly within the rating schedules, questions of moral hazard and the like.

ADVANTAGES AND DISADVANTAGES OF THE NUMERICAL SYSTEM

The advantages which may fairly be claimed for the method are:

(1) That it results in a more uniform treatment of risks, because the judgment of the individual medical selector is steadied and restrained by the use of standards.

(2) That the liability to error is greatly reduced by the detailed analysis to which each risk is subjected.

(3) That the work of the medical expert is much lessened because so much of it may safely be entrusted to clerks.

(4) That a more careful analysis of difficult or doubtful cases is made possible because past experience with reference to the doubtful points is expressed numerically in terms of a known standard, and shadings from that past experience either favorable or unfavorable may be more intelligently made, and,

(5) Finally, in the handling of a large business greater speed is possible because as much as two thirds of the business may be passed through the hands of trained clerks without having it brought to the attention of medical experts at all.

There have been many criticisms of the numerical method, but we believe that most of them are based upon a misunderstanding of its operation.

(a) It has been claimed that the numerical method assumes that the valuation of every risk is the simple algebraic summa-

tion of its various factors. It has been pointed out very truly that so many of the factors of a risk may be favorable and so few unfavorable that their summation reduces its value beyond all reasonable limits, and that, in the same way, the unfavorable factors may be so heaped up upon one another as to produce an ultimate ratio high out of proportion to anything that may actually occur in nature. Take, for example, a clergyman, an occupation which is conducive to longevity, whose build is most favorable, whose family is very long lived and whose habits are first class. The summation of all of these favorable factors may very well produce a valuation even lower than so favorable a combination would produce in nature. Undoubtedly the stock from which such a risk springs has expressed its moral and its physical energy in the occupation and the temperate life of this individual. On the other hand, the rating for a bartender who is known to use alcohol freely or from time to time to excess is not the algebraic summation of the two factors of occupation and habits for the reason that the high mortality incident to the occupation of bartender is in part due to the fact that substantially all bartenders use alcohol freely. The valuation of all such cases, especially where the factors may be interrelated, must always be tempered by the judgment of the medical expert.

(b) Again it has been said that factors are so often interrelated that the true valuation may not fairly be expressed by the numerical process. As a case in point, it has recently been proven that the ratings for a mitral regurgitant heart murmur and for a recent attack of rheumatism, when added together, are not sufficient to cover the risk if these two impairments occur in the same individual.

However valid these criticisms may be, and we recognize their force, our contention is that, even in such cases, the medical expert is assisted greatly in carrying on his work by having before him, expressed in terms of a mortality standard, the significance of each of the factors of the risk he is studying.

(c) It has also been claimed that the numerical method does not lend itself to those types of cases in which the mortality in-

creases or decreases with the passage of time. The method which we have adopted of meeting this objection is for the actuary and medical director to express in terms of a uniform flat rating the aggregate result of a mortality known to increase or decrease. The ratings of almost all such cases may be converted into flat ratings, whether for life or for a period of years, and in those cases which cannot be treated in this fashion, those in which a very considerable present hazard falls rapidly until it almost or altogether disappears, such as a history of certain types of cancer or ulcer, the extra hazard may be expressed by a very high rating extending over a very short period of years.

(d) It has also been urged that our knowledge of the significance of some factors is not sufficient to determine for us what ratings should be employed to express them. This is true. But if a person who is called upon to give expert judgment of the value of a risk does not have data upon which to base a rating for the special hazard involved, he is equally unable to express an expert judgment anyhow. The fact is that a judgment of the value of a risk for insurance must always be based on the most accurate knowledge available, and where there is no such knowledge, the judgment of the individual selector is of little value, whether he expresses his opinion numerically or in any other fashion. In all such cases a consultation between the selector, with his knowledge of the medical aspects of the case, and the actuary, with his ability to convert that knowledge into mortality ratios, should make it possible to fix upon a provisional valuation to be used until a more exact ratio may be determined by experience.

(e) Another objection that has been raised is that the automatic application of this method does not always make due allowance for the fact that the applicant is a better or a poorer risk than the average of his class with respect to the factor under consideration. There is no point in this criticism for the reason that the numerical value of any factor is but the value of average cases possessing that factor and is to be used by the expert as his central guide, on either side of which he knows there are many cases better or worse than the average. He

should also appreciate that these variations from the average are much better expressed numerically in terms of a standard than they could be expressed without the use of it.

One objection which, if true, would appeal to all of us is that, if all the companies employed a uniform standard, some persons in need of insurance might be excluded from its benefits. But this objection is without foundation. The numerical system does not prejudice the standing of any risk. Its operation is based upon experience, upon statistical evidence, and if any individual fails to get insurance by reason of that evidence or experience he deservedly fails.

The old adage that "the proof of the pudding is in the eating of it," applies nowhere more forcefully than in the case of the numerical method of valuing lives for insurance. Two of the larger companies and some of the smaller which have for a number of years applied this system to their entire business are satisfied with it; and other companies which have made experiments in that field have seen no reason to discontinue them, but, on the contrary, are making every effort to give a more extended application to the method.

STATISTICAL BASIS OF BUILD RATINGS

During the last twenty years there has been accumulated a great deal of information regarding most of the factors that enter into the composition of a risk. It is not unlikely that we know more about the element of build than any other of them, but we have a great deal of information regarding occupation, habits, various types of personal history, of physical condition, and the like. Indeed the information available in one form or another, bearing upon all of these factors, is so considerable that no medical director who takes the pains to study it need feel that he is entirely in the dark with reference to any of them. If those who are interested in the subject will avail themselves of the information already at hand, there should be little difficulty in establishing everywhere either the numerical or some other systematic form of medical selection.

In the report of the Joint Committee there appear sets of

mortality ratios according to departure from the average weight expressed (a) in pounds and (b) in percentages. These are presented in three sets of tables, one for short men (under 5 ft. 7 in.), one for men of medium height (5 ft. 7 in. to 5 ft. 10 in.), and one for tall men (over 5 ft. 10 in.). They contain mortality ratios applicable to risks 30 per cent., or 40 pounds underweight to 40 per cent., or 75 pounds overweight, inclusive, for groups of ages beginning with 20-24 and ending with 60-62. From these tables it is a simple matter to deduce standards for the selection of risks based on either percentage departure or pounds departure from the average weight.

With reference to the different mortalities due to differences in height, the Committee said, "There is not a marked difference between short men and men of medium height except for underweights at young ages at entry, nor between tall men and men of medium height except for the younger ages at entry at all weights and for men distinctly overweight at all ages." But these exceptions are so important at certain points that, as anyone who studies the tables can see, no table of standard ratios would be complete which did not take into account the element of height. Furthermore the ratios published by the Committee are for various age groups and do not apply to any ages except those at the center of gravity of each group, whereas, to keep down the proportion of errors in routine work, it is probably better to express the ratios for given ages rather than for given age groups. Moreover, the Committee limited itself to expressing these ratios only in so far towards the overweight side as the data at hand permitted, whereas in routine practice we are frequently called upon to place valuations upon lives considerably heavier than the maximum limit of 40 per cent. Still further, the center of gravity of the testimony regarding short men (under 5 ft. 7 in.) manifestly does not apply to all persons under that height, however short they may be, nor does the testimony for tall men apply to all persons over 5 ft. 10 in. in height, however tall. The center of gravity of the latter group is slightly less than 6 ft., and of the former slightly over 5 ft. 5 in., and any risks below

or above these heights respectively should receive a rating depending upon those differences in height. A convenient basic table for office use should take into account all of these facts. It should also allow, as has been done in the Joint Committee's report, for the probable influence of the very careful selection which has been exercised among very lightweight people, especially at the younger ages, and among heavyweight people generally in the M.-A. experience. Among the tall heavyweights there has perhaps been a disposition in all of our offices to look upon them as less undesirable than those of average height or below, and the selection among them may have been correspondingly indulgent.

Making what is believed to be a fair allowance for these considerations, the following basic table (A) has been prepared which applies to persons 5 ft. 8 in. in height; and in order that it shall be available for taller and shorter persons as well, tables of corrections for height are also given. In all of these tables the percentage of departure from the average weight is based upon the Medico-Actuarial Height and Weight tables. The mortality ratios for persons markedly overweight is based partly on the Medico-Actuarial experience, partly on the New York Life experience and where the statistics were scanty, partly on our judgment. The minimum difference in rating in our practice is 5 points.

TABLE A

MORTALITY RATINGS

MORTALITY RATINGS. MEN—5 FEET 8 INCHES IN HEIGHT

Percentage Departure from Average Weight

Age	-30%	-25%	-20%	-15%	-10%	-5%	0	+5%	+10%	+15%
15	155	145	135	125	115	110	105	100	95	95
20	140	130	125	115	110	105	100	95	95	95
25	130	120	115	110	105	100	95	95	95	100
30	120	115	110	105	100	100	95	95	95	100
35	115	110	105	100	100	95	95	95	100	105
40	110	105	100	100	100	95	95	95	100	105
45	105	100	100	100	95	95	95	100	105	110
50	105	100	100	100	95	95	95	100	105	110
55	100	100	100	100	95	95	95	100	105	100
60	100	100	100	100	95	95	95	100	105	110

TABLE A—Continued

Age	+20%	+25%	+30%	+35%	+40%	+45%	+50%	+55%	+60%	+65%	+70%
15	95	100	105	110	115	125	135	140	150	165	175
20	100	105	110	120	130	140	150	160	170	180	195
25	105	110	120	130	140	150	160	170	180	195	205
30	110	120	125	135	145	160	170	180	195	205	220
35	115	125	135	145	155	165	180	190	205	215	230
40	115	125	135	145	160	170	185	195	210	220	235
45	120	130	145	155	165	180	195	205	220	230	245
50	120	130	145	155	165	180	195	205	220	230	245
55	120	130	145	155	165	180	195	205	220	230	245
60	120	130	145	155	165	180	195	205	220	230	245

MODIFICATION FOR HEIGHT

*Underweight**Age 15**Percentage Departure from Average Weight*

Height	-30%	-25%	-20%	-15%	-10%
5 ft. 0 in.	-20	-20	-15	-15	-10
5 " 2 "	-15	-15	-10	-10	-5
5 " 4 "	-10	-10	-5	-5	0
5 " 6 "	-5	-5	0	0	0
5 " 8 "	0	0	0	0	0
5 " 10 "	+5	+5	0	0	0
6 " 0 "	+10	+10	+5	+5	0
6 " 2 "	+15	+15	+10	+10	+5

Age 20

Height	-30%	-25%	-20%	-15%
5 ft. 0 in.	-15	-15	-10	-10
5 " 2 "	-10	-10	-5	-5
5 " 4 "	-5	-5	0	0
5 " 6 "	0	0	0	0
5 " 8 "	0	0	0	0
5 " 10 "	0	0	0	0
6 " 0 "	+5	+5	0	0
6 " 2 "	+10	+10	+5	+5

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TABLE A—Continued
Ages 25 and 30

Height	-30%	-25%	Height	-30%	25%
5 ft. 0 in.....	-10	-10	5 ft. 8 in.....	0	0
5 " 2 ".....	-5	-5	5 " 10 ".....	0	0
5 " 4 ".....	0	0	6 " 0 ".....	0	0
5 " 6 ".....	0	0	6 " 2 ".....	+5	+5

Overweight
All Ages at Entry

Height	+20%	+25%	+30%	+35%	+40%	+45%	+50%	+55%	+60%	+65%	+70%
5 ft. 0 in.	-5	-5	-5	-5	-5	-10	-10	-15	-15	-15	-15
5 " 2 "	-5	-5	-5	-5	-5	-5	-5	-10	-10	-10	-10
5 " 4 "	0	0	0	0	0	0	0	-5	-5	-5	-5
5 " 6 "	0	0	0	0	0	0	0	0	0	0	0
5 " 8 "	0	0	0	0	0	0	0	0	0	0	0
5 " 10 "	+5	+5	+5	+5	+5	+10	+10	+10	+10	+15	+15
6 " 0 "	+5	+10	+10	+10	+10	+15	+15	+15	+15	+20	+20
6 " 2 "	+10	+15	+15	+15	+15	+20	+20	+25	+25	+30	+30
6 " 4 "	+10	+15	+15	+20	+20	+25	+25	+30	+30	+35	+35

It will be noted that the general lines of the above tables are the same as in the tables of the Joint Committee, but that the latter ratios are lower among (1) lightweight men at the young ages and (2) higher among overweights. It will also be noted that the modifications for height differ from the Joint Committee's report. The higher mortality among the tall as compared with the short young men has probably been due at least in part to tuberculosis, and as the knowledge of the control of that disease has greatly advanced during recent years we have not made as great a change as the Committee recommend. We thought it undesirable to give the full credit to short young men who were underweight. Among overweights the imposing appearance of tall overweight men has had its effect in a more indulgent selection, and indeed medical examiners are apt to be unconsciously affected by their imposing appearance. With respect to overweights generally there has always been a strong

appeal based on the claim that they are peculiarly muscular and vigorous. It is not impossible therefore that at least one half of the extra mortality found among the tall as compared with the medium-sized men of the same percentage overweight has been due to a less severe selection practiced among them, and that not more than one half of their higher mortality is inherent in their greater height.

In the practical application of this table the first step, as we have said, is (1) to determine the degree of over- or underweight as compared with the average weight at the given age; then (2) by reference to the standard table to ascertain the fundamental rating due to that degree of over- or underweight and (3) to make allowance, if necessary, for height, whether above or below the average (5 ft. 8 in.).

A single instance will suffice for illustration. A man aged 35, weighs 229 lbs. and is 6 ft. in height. By reference to the standard table of heights and weights he is found to be 30 per cent. overweight. Referring to the basic table we find that a man 35 years of age and 30 per cent. overweight has a basic rating of 135. By reference to the table of modifications due to height we find that a person 6 ft. in height, 30 per cent. overweight, should have 10 points added by reason of his height alone. Thus his total rating becomes 145. This is the basic rating for a man of his height, weight, and age, and upon it is to be built up the valuation of the risk so far as the other factors are concerned.

In practice in our own company we have incorporated all of the facts contained in the last two tables on a single sheet on which are printed the basic ratings for all the degrees of over- and underweight at each quinquennial age. The table employed by us (Table B) is reproduced herewith. It is merely a rearrangement of Table A. The figure in large type in the center of each square is the basic rating for 5 ft. 8 in. in height. The small figures to the left of each square (if any) are the modifications for 5 ft. 0, 5 ft. 2 in., 5 ft. 4 in., and 5 ft. 6 in. The figures in the right hand of each square are the modifications for 6 ft. 4 in., 6 ft. 2 in., 6 ft., and 5 ft. 10 in.

TABLE B

[illegible]

TABLE B (Continued)
 BASIC RATINGS FOR BUILD. (AVERAGE FAMILY HISTORY).
 Percentage Departure from Average Weight.

Age	Height	-30%	-25%	-20%	-15%	-10%	-5%	0	+5%	+10%	+15%	Age
15	5-0	+20	+20	+15	+15	+15	+10	105	100	95	95	15
	5-2	+15	+15	+10	+10	+10	+5	110	105	100	95	
	5-4	+10	+10	+5	+5	+5	0	115	110	105	100	
	5-6	+5	+5	0	0	0	0	120	115	110	105	
	5-8	0	0	0	0	0	0	125	120	115	110	
	6-0	-5	-5	-10	-10	-10	-10	130	125	120	115	
20	5-0	+15	+15	+10	+10	+10	+5	105	100	95	95	20
	5-2	+10	+10	+5	+5	+5	0	110	105	100	95	
	5-4	+5	+5	0	0	0	0	115	110	105	100	
	5-6	0	0	0	0	0	0	120	115	110	105	
	5-8	-5	-5	-10	-10	-10	-10	125	120	115	110	
	6-0	-10	-10	-15	-15	-15	-15	130	125	120	115	
25	5-0	+10	+10	+5	+5	+5	0	110	105	100	95	25
	5-2	+5	+5	0	0	0	0	115	110	105	100	
	5-4	0	0	0	0	0	0	120	115	110	105	
	5-6	-5	-5	-10	-10	-10	-10	125	120	115	110	
	5-8	-10	-10	-15	-15	-15	-15	130	125	120	115	
30	5-0	+10	+10	+5	+5	+5	0	105	100	95	95	30
	5-2	+5	+5	0	0	0	0	110	105	100	95	
	5-4	0	0	0	0	0	0	115	110	105	100	
	5-6	-5	-5	-10	-10	-10	-10	120	115	110	105	
	5-8	-10	-10	-15	-15	-15	-15	125	120	115	110	
35	5-0	+10	+10	+5	+5	+5	0	100	95	95	100	35
	5-2	+5	+5	0	0	0	0	105	100	95	100	
	5-4	0	0	0	0	0	0	110	105	100	105	
	5-6	-5	-5	-10	-10	-10	-10	115	110	105	100	
	5-8	-10	-10	-15	-15	-15	-15	120	115	110	105	
40	5-0	+10	+10	+5	+5	+5	0	100	95	95	100	40
	5-2	+5	+5	0	0	0	0	105	100	95	100	
	5-4	0	0	0	0	0	0	110	105	100	105	
	5-6	-5	-5	-10	-10	-10	-10	115	110	105	100	
	5-8	-10	-10	-15	-15	-15	-15	120	115	110	105	
45	5-0	+10	+10	+5	+5	+5	0	95	95	100	110	45
	5-2	+5	+5	0	0	0	0	100	100	105	110	
	5-4	0	0	0	0	0	0	105	105	110	110	
	5-6	-5	-5	-10	-10	-10	-10	110	110	110	110	
	5-8	-10	-10	-15	-15	-15	-15	115	115	110	110	
50	5-0	+10	+10	+5	+5	+5	0	95	95	100	110	50
	5-2	+5	+5	0	0	0	0	100	100	105	110	
	5-4	0	0	0	0	0	0	105	105	110	110	
	5-6	-5	-5	-10	-10	-10	-10	110	110	110	110	
	5-8	-10	-10	-15	-15	-15	-15	115	115	110	110	
55	5-0	+10	+10	+5	+5	+5	0	95	95	100	110	55
	5-2	+5	+5	0	0	0	0	100	100	105	110	
	5-4	0	0	0	0	0	0	105	105	110	110	
	5-6	-5	-5	-10	-10	-10	-10	110	110	110	110	
	5-8	-10	-10	-15	-15	-15	-15	115	115	110	110	
60	5-0	+10	+10	+5	+5	+5	0	95	95	100	110	60
	5-2	+5	+5	0	0	0	0	100	100	105	110	
	5-4	0	0	0	0	0	0	105	105	110	110	
	5-6	-5	-5	-10	-10	-10	-10	110	110	110	110	
	5-8	-10	-10	-15	-15	-15	-15	115	115	110	110	

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At this point it may be of interest to mention the practice of one of the other large companies in dealing with basic ratings. According to the method that we have just described it is necessary in order to arrive at the basic rating of any risk to ascertain (1) the percentage over or underweight *at the given age* and (2) by reference to the basic table to ascertain the basic rating due to that degree of departure from the average weight at the given age. It is a matter of common knowledge among Medical Directors and Actuaries that the most favorable weight for any age is usually not the average weight for that age, but is above the average weight at the younger ages and below the average at the older ages, and it happens that the best weight (the point of lowest mortality) at all ages whether young or old approximates the average weight at about age 37. In the M.-A. Investigation the best weight at the various ages is shown to be at the following percentages of departure from the average weight, and it will be seen that a line drawn from the best weight at age 20 to the best weight at age 60 intersects the average weight line from age 20 to age 60 at about age 37.

<i>Ages at Entry</i>	<i>Percentage of Variation from Average Weight</i>
20-24.....	+10%
30-34.....	+ 5%
40-44.....	- 5%
50-53.....	-10%
60-62.....	-15% to -30%

It happens then that if all variations in weight were measured from the "best weight" a single table may be used for all ages, and that table would be based on the average weight for the age group 35-39 inclusive. The Company referred to arrives at the basic rating without reference to the element of age by measuring all of its risks according to the weight at the mean age, 37. By this means the first step in the routine procedure referred to above is avoided and, the percentage of departure from the best weight having been determined, the table of basic ratings gives at a glance the ratings at every age for that degree of departure. The advantage of this procedure

is the elimination of the first step, the determination of the percentage over or underweight from the average weight at the age, and the consequent greater simplicity in operation and greater speed in rating. The main disadvantage lies in the fact that the procedure does not give the selector as accurate a picture of the risk compared with other risks of the same age, but measures all of the risks according to the weight at the central age, which is about age 37. Thus a person 6 ft. in height and 152 lbs. in weight would be 15 per cent. underweight measured by the age 37 standard whereas a person of that height and weight at age 20 would be but 5 per cent. under the average weight for his age and height. From this it will be seen that the minds of those who employ this method must be readjusted so as to visualize the percentage of departure from the best weight at the given age, instead of from the average weight at that age.

Another disadvantage which may be only theoretical is that should any change take place in the future in the "best weight" by reason, for example, of a marked decrease in tuberculosis at young entry ages, or by reason of the elimination of the use of alcohol among persons slightly overweight, what now appears to be the best weight may not in the future prove to be the best weight. Future statistics based on the *average* weight at age will be easily comparable with those at present of record. Any future statistics based on the "*best*" weight, although exhibiting the same general tendencies, must continue liable to possible future changes or involve considerable labor in their conversion to average weight at age.

We have had no practical experience of the operation of this method of measuring risks according to their departure from the best weight rather than from the average weight, but are assured that those who have employed it are entirely satisfied with its practical application.

WOMEN

A comparison of the average weight of women and of men as set forth in the report of the Medico-Actuarial Mortality In-

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vestigation shows that, excepting at the extremes of age, women are of somewhat lighter weight than men at the same height and age. The following table shows the difference in the weight of men and of women at various heights and ages:

Excess of Weight of Men Over that of Women

Height	20	30	40	50
	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>
5 ft. 0 in.....	3	6	4	1
5 " 3 ".....	3	6	3	0
5 " 6 ".....	4	6	3	0
5 " 9 ".....	5	6	5	1

These differences amount to about 3 per cent. at age 20, about 4 per cent. at age 30, about 2 per cent. at age 40, and 0 per cent. at age 50.

In Volume II of the Medico-Actuarial Investigation the effect of underweight or overweight, particularly at the younger ages, is stated to be less among women than among men, but the data on women are not sufficient to determine mortality ratings for them with the same degree of confidence as those for men. Naturally then the question whether a different table of heights and weights should be employed by which to measure them, or whether the use of the same basic ratings is warranted, may not fully be decided at the present time. For practical purposes there is good ground for the use of a separate table of heights and weights for women and, having employed a separate table, we are justified in assuming that the basic mortality ratings determined by the facts thus brought out are as nearly true as any that can be at present adduced. One of the companies uses the same table of heights and weights for both men and women but our own Company thinks that the use of a different table is advisable. The former method produces generally a slightly better basic rating

for women than for men of the same departure from the average weight.

ABDOMINAL GIRTH

In the "Standard Mortality Ratios Incident to Variations in Height and Weight Among Men" the Joint Committee presents some study of the influence of excessive abdominal girth upon mortality. The results of the M.-A. Investigation were analyzed and were combined with the experience of one of the large companies. From these data a table was deduced expressing the extra mortality incident to excess abdominal girth, to be used in the form of additions to the basic ratings for height and weight alone. These overweight risks which show a large abdominal girth are evidently the less favorable of the overweights as a class, and it is evident that among the more favorable overweights the abdominal girth is correspondingly smaller. It seems not unreasonable therefore that some allowance should be made in those cases where the abdominal girth is distinctly less than that of the chest expanded. Provisionally, and subject to modifications upon further proof, the following table of debits and credits is used to correct for specially favorable and unfavorable build with respect to abdominal girth.

DEBITS FOR ABDOMINAL GIRTH GREATER THAN CHEST EXPANDED

Abdominal Girth	PERCENTAGE OVERWEIGHT								
	30% or Less			31% to 40%			Over 40%		
	Age Under 40	Age 40 to 50	Age Over 50	Age Under 40	Age 40 to 50	Age Over 50	Age Under 40	Age 40 to 50	Age Over 50
0 inch excess	0	0	0	0	0	0	0	5	10
1 " "	0	0	5	0	5	10	5	10	20
2 " "	0	5	10	5	10	15	10	20	35
3 " "	5	10	15	10	20	25	15	35	55
4 " "	10	15	25	20	30	40	25	50	75

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CREDITS FOR ABDOMINAL GIRTH LESS THAN CHEST EXPANDED

Abdominal Girth Less than Chest Expanded, Inches	PERCENTAGE OVERWEIGHT								
	20% to 30%			31% to 40%			Over 40%		
	Under Age 40	Age 40 to 50	Above Age 50	Under Age 40	Age 40 to 50	Above Age 50	Under Age 40	Age 40 to 50	Above Age 50
-1.....	0	0	0	0	0	0	0	0	0
-2.....	0	0	0	0	0	5	0	-5	-10
-3.....	0	0	-5	0	-5	-10	-5	-10	-15
-4.....	0	-5	-10	-5	-10	-15	-10	-15	-20

These credits for abdominal girth less than chest expanded are quite conservative for the reason that among well-built men of average height, the girth of the expanded chest is usually at least 2 inches greater than that of the abdomen.

ENDOWMENT INSURANCE IN THE CASE OF OVERWEIGHTS

The Medico-Actuarial Investigation showed that overweight at the younger ages is not of serious significance but that the relative mortality increases with advancing age at entry, and the committee showed in a separate table deductions which might fairly be made for insurances which ran for limited periods of time. These deductions increased with the degree of overweight. The table presented by the committee covers only risks which were limited to fifteen or twenty years and did not entirely cover the range of our office practice, as will appear in the following table of corrections:

ENDOWMENTS MATURING UNDER AGE 55

Nearest Age	PER CENT. OVERWEIGHT												
	15	20	25	30	35	40	45	50	55	60	65	70	
15.....	0	0	0	0	0	- 5	- 5	-10	-10	-10	-15	-15	
20.....	0	0	0	5	-10	-10	-10	-15	-15	-15	-20	-20	
25.....	0	0	- 5	- 5	-10	-10	-15	-15	-15	-20	-20	-25	
30.....	0	- 5	- 5	- 5	-10	-10	-10	-10	-15	-15	-15	-15	
35.....	0	- 5	- 5	- 5	- 5	-10	-10	-10	-10	-10	-10	-10	
40.....	0	0	0	0	- 5	- 5	- 5	- 5	- 5	- 5	- 5	- 5	

For endowments maturing at 55 to 59 inclusive allow 5 points less.

For endowments maturing at 60 and over inclusive allow 10 points less.

CREDITS AND DEBITS FOR PLAN OF INSURANCE

While logically the factor of plan for insurance should be considered after all the other factors that make up a risk have been taken into account, it has seemed necessary to refer to endowment insurance in connection with the subject of overweight, and, as the question has thus been brought up, it may be proper, though out of its logical order, to consider here the matter of plan of insurance.

It has been our practice for a number of years to make a charge of 10 points in cases of term insurance, but until recently we have made no credit allowance for endowment insurance. Our present practice is to give the following credits and debits which, in the light of the evidence contained in Volume II of the report of the American-Canadian Mortality Investigation, are conservative. The result of applying them is that in certain borderline cases, some of those who apply for endowment insurance are granted policies without advance in age, whereas, if they had applied for insurance on one of the life plans, they would have been granted insurance only with an advance in age. The net result of making these allowances is a finer discrimination and a more just treatment of certain borderline risks.

Term Insurance.....	+15
Limited Payment, 20 years or less, paid-up before age 65..	- 5
Endowment for 20 years or less, maturing before age 55..	-10
Endowments, not included above, maturing before age 70	- 5

FAMILY HISTORY ASIDE FROM CONSUMPTION

It is extremely difficult to fix upon ratios which shall exactly express the influence of family history upon longevity. The risks at the present time on the books of the life companies have all been selected with the element of family history in mind, and those with the more favorable family histories have received proportionately liberal treatment, while those with unfavorable histories have been selected with corresponding severity. The risks with a poor family history have in consequence been on the whole somewhat better risks in other re-

spects than those with a good family history. Such information as we have been able to secure on the subject leads us to believe that, for practical purposes, we may assume a range of about thirty points between a very good family history on the one hand, and a very poor family history on the other. In this case, as between an average family history and a very good one, the latter should receive a credit of fifteen points and a corresponding debit of fifteen points should be given to a very poor family history. In determining what should be regarded as an average, a very good, a very poor, etc., family history, we have employed the expedient of arranging a large number of family histories in serial order, according to their value as determined by a number of experts acting separately on each case. With a series thus prepared as a guide, clerks soon become able to classify each family history in accordance with the standards adopted, and to assign the proper debit or credit according to the details presented in the record.

It has been our practice to follow certain rather arbitrary rules in determining the value of family history. For those who are interested we quote from them.

"One death in family, below age 60, from cancer, diabetes, apoplexy, insanity or suicide, places the risk in the 'average' longevity group; two or more deaths in family places the risk in the 'Deficient' longevity group."

"Mother dead of childbirth in a bad or tuberculous family history is considered as death from consumption; otherwise it may be ignored."

CONSUMPTION IN THE FAMILY RECORD

In Volume V of the Medico-Actuarial Investigation there appears a statement of the relative mortality among men with a family record of tuberculosis. The largest classes were (a) those with tuberculosis in one brother or sister and (b) those with tuberculosis in one parent. In general it appeared that the mortality at the younger entry ages among the underweights was high, and that, except at the very young ages, the

mortality among persons above average weight seemed not to be affected by the consumptive family record. The results of that study were evidently very greatly affected by the very careful selection which must have been practiced at the time the risks were accepted, and also by the large proportion of endowment insurances applied for and granted among these risks. The selection was undoubtedly more severe among the risks included in the M.-A. Investigation than those accepted by the New York Life as substandard lives on payment of an extra premium.

Taking these various modifying influences into account, the tables (C) now presented of graded additions to the build rating express, as nearly as may be, the effect of tuberculosis in the family history upon risks uninfluenced by any special selection or anti-selection. These ratings apply to one or more consumptives in the immediate family, among parents, brothers and sisters but do not refer to grandparents, uncles, aunts, or cousins. It is not unlikely that the significance of the death of a brother or sister from consumption is greater than the death of a parent from that disease, but as the difference is of moment at the younger entry ages only, the construction of a separate table to represent it is hardly warranted.

It will be noticed that the additions to be applied to the basic ratings are very small among the heavier weights and gradually increase towards the light weights until among very slender persons they are quite heavy. These ratings also rapidly decrease with increased age until at the later ages of life they are very slight. This is in accordance with the testimony of the Medico-Actuarial Mortality Investigation supplemented by the experience of our own Company, and probably expresses closely what will occur hereafter, at any rate until the fight against consumption has modified greatly the mortality incident to that disease.

For purposes of greater convenience we have consolidated these additions due to consumption in the family history with the basic ratings so as to embrace in a single table, build in connection with consumption in the family record. In the

TUBERCULOSIS IN FAMILY RECORD

One Death from Tuberculosis

Percentage Departure from Average Weight

[illegible]

practical use of this table we credit or debit for the character of the family history aside from the element of consumption, so that these basic ratings may be increased or decreased by as much as 15 points according to the circumstances in the case.

OCCUPATION

The mortalities incident to a comparatively limited number of occupations have been accurately determined. The Specialized Mortality Investigation dealt to some extent with the subject, but the mortality standard employed in that study was too high and the mortality ratios were too low. In the Medico-Actuarial Investigation there appears a wealth of information on occupation. In addition to these sources a number of companies have analyzed their experience with some occupations, and running through the literature issued by the United States Government, by the Registrar General of England, and by various labor unions, State Labor Commissions, State Mining Bureaus, and other bodies, there is to be found a considerable volume of data concerning occupations, so that any Company that is interested has at hand the material with which to build up for itself a schedule of ratings for occupations. We hope at a future meeting of either the Actuarial Society or the Association of Life Insurance Medical Directors to discuss this subject at greater length, but this paper is already too long to warrant further reference to the subject than to give a few illustrations:

Farmers.....	-15	R. R. Yard Master	
Architects		Ambulance Drivers	.... +30
Bank Officers	-10	Placer Miners	
Teachers		Actors	
Clerks	0	Chauffeurs (Public)	.... +40
Jewelers		Laborers	
Carpenters		Granite Cutters	.... +50
Plumbers	+10	Fire Dept. men	
Bricklayers		Saloonkeepers	.... +75
Bookbinders		Metal Grinders	
Cigarmakers	+15	Locomotive Firemen	
Butchers			

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PERSONAL HISTORY

It is hardly possible within the limits of this paper to refer to more than one or two examples of the many personal history impairments:

RHEUMATISM—ACUTE ARTICULAR

	Within 1 Yr.	1-5 Yrs.	Over 5 Yrs.
Single attack.....	+30	+20	+10
Two or more attacks.....	+40	+25	+15

SYPHILIS (CURED)

	Thoroughly Treated	Not Thoroughly Treated
Initial lesion only.....	+30	+ 50
Slight secondaries.....	+40	+ 75
Marked saturation.....	+50	+100
Tertiary symptoms.....	Decline	Decline

By thorough treatment is meant adequate supervision for at least two years including mixed treatment and freedom from symptoms for at least one year before discontinuance of treatment.

These are sufficient to give an idea of our practice of expressing in terms of a given standard the effect upon mortality of the various incidents of personal history.

HABITS IN THE USE OF ALCOHOL

This subject was exhaustively studied in the Medico-Actuarial Mortality Investigation and the results published in the committee's report, due allowance being made for the marked anti-selection bound to take place among such risks, should serve as a guide for the future. Our own experience in dealing with the subject of habits has been less satisfactory than with almost any other impairment. The information concerning

these cases is difficult to secure. Sometimes it is exaggerated, sometimes it is understated, with the result that of the offers made, the latter class accept them freely and the former refuse them.

With a view to expressing in a general way what is likely to happen among some of these risks, and for the purpose of illustration within the limits of this paper, we give the following.

HABITS IN THE USE OF ALCOHOL

Occasional excesses up to six times a year.....	+50 to +100
History of, 10 years ago.....	+25 to + 50

PHYSICAL CONDITION

As in the case of personal history we limit ourselves to two examples of the many impairments:

MITRAL REGURGITATION

Very Best, No Hypertrophy	Average. No Hyp.	With Slight Hyp.	With Moderate Hyp.	With Considerable Hyp.
+60	+75	+100	+125	Decline

GLYCOSURIA, INTERMITTENT

If under diet or treatment.....	Decline
If clearly without diet or treatment.....	+50 to +100

HABITAT

Volume II of the American-Canadian Mortality Investigation contains a very complete review of the experience of life companies in the different sections of the United States. It shows a mortality about 10 per cent. better than the average in the farming section between Minnesota and the Dakotas on the north and Kansas on the south, a mortality only slightly above or slightly below the average elsewhere, excepting in seven Southern States, where it is 24 per cent. above the average. For practical purposes and by reason of the fact that our

insurance population is one that moves freely from one part of the country to another, it is rather difficult to fix a definite value for the factor of habitat. With any business limited to the United States, two methods may be adopted with regard to certain of the Southern States, either (a) to refrain from doing business in these States or in the less healthful sections of them, or (b) to add a rating to meet the expected extra mortality. This latter course would result in a larger percentage of the business being declined or treated as sub-standard.

MORAL HAZARD

By moral hazard in the insurance sense is meant speculative hazard, questionable character of the applicant, amount of insurance in excess of the applicant's finances, lack of insurable interest, and other similar matters. The significance of these may not be expressed in terms of any standard, and wherever any risk is doubtful or undesirable by reason of any of them, it is customary to decline the risk, reduce the amount, or offer short-term endowment insurance.

PRACTICAL APPLICATION OF THE SYSTEM

In order to show the practical application of the numerical system for the rating of risks, a few examples are here given:

1. A carpenter aged 30.
Height 6 ft. 2 in.
Weight 138 lbs. (25 per cent. under weight).
Father died of consumption, aged 30, family history otherwise of average quality.

Basic rating (25 per cent. under weight).....	115
Allowance for height.....	+ 5
Addition for one consumptive in family history.....	+ 30
Occupation.....	+ 10
Total value.....	160
2. A journeyman butcher, aged 40.
Height 5 ft. 2 in.
Weight 162 lbs. (20 per cent. over weight) with excess abdominal girth of 3 inches.
Family history average.
Applied for \$2000, 15-year endowment.

Thirtieth Annual Meeting

Basic rating (20 per cent. over weight).....	115
Allowance for height.....	- 5
3 in. excess abdominal girth.....	+ 10
Occupation.....	+ 15
Plan of insurance.....	- 5
Total value.....	130

3. A farmer, aged 30.
 Height 5 ft. 8 in.
 Weight 137 lbs. (10 per cent. under weight).
 Of very long-lived family.
 Applies for 10-year term.

Basic rating (10 per cent. under weight).....	100
Excellent family history.....	- 15
Occupation.....	- 15
Plan of insurance.....	+ 15
Total value.....	85

4. A bank officer, aged 50.
 Height 6 ft.
 Weight 256 lbs. (40 per cent. over weight).
 Shows an abdominal girth 3 inches less than chest expanded.
 Has a good family history.

Basic rating (40 per cent. over weight).....	165
Allowance for height.....	+ 10
Allowance for abdominal girth.....	- 10
Family history.....	- 10
Occupation.....	- 10
Total value.....	145

5. A jeweler, aged 35.
 Height 5 ft. 10 in.
 Weight 198 lbs. (20 per cent. over weight).
 Family history slightly better than average.
 Contracted syphilis 14 years ago. He had mild secondaries for six months and was under treatment for eighteen months after the disappearance of all symptoms.
 He was never intoxicated, but used alcohol rather freely up to five years ago, when he married, and he has been practically an abstainer ever since.

Basic rating (20 per cent. over weight).....	115
Allowance for height.....	+ 5
Allowance for family history.....	- 5
Occupation.....	0
Personal history.....	+ 40
Habits.....	+ 40
Total value.....	195

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6. A journeyman cigarmaker, aged 40.
 Height 5 ft. 8 in.
 Weight 142 lbs. (10 per cent. under weight).
 Average family history.
 Good personal history.
 Habits negative.
 Is found on examination to have a mitral regurgitant heart murmur with slight hypertrophy.

Basic rating.....	100
Family history.....	0
Occupation.....	+ 15
Physical condition.....	+100
Total value.....	215

RESTRICTION OF CREDITS

The allowance of credits for favorable factors must be practiced with certain reservations. When there is, for example, an impairment like albuminuria, the practice is not to grant standard insurance although credits for family history, for favorable build, for occupation or the like may bring the case within the standard limit. In the same way with other impairments, such as a history of syphilis, or marked overweight, the credits due to favorable factors are not permitted to offset the unfavorable personal history to the extent of bringing the risk within the standard class. Unless such common-sense practices were followed the numerical system would fail in its purposes.

MAXIMUM RATING FOR STANDARD RISKS

One of the important questions to be determined is the rating above which all risks should be considered as sub-standard and either declined or granted insurance with an extra premium or by some other device calculated to provide for the increased mortality. In any life Company, the value of its standard risks, as we have already said, ranges by insensible degrees from the very best on the one hand to the slightly undesirable risks on the other. Any Company's average experience of 100 per cent. is produced by the grouping together of risks that are much better than 100 per cent. with risks that are clearly worse. The considerable proportion of risks rated at 80 per cent. on the

one hand is offset by a corresponding proportion of risks rated at 120 per cent. The proportion of risks at 85 per cent. is offset by a similar number rated at 115 per cent., and so on. The problem then is for each Company to determine at what point it should fix the limit of its standard class. In our own Company that limit is fixed at 125 per cent. in general. In the practical use of this limit care must be taken to guard against the natural tendency to shade the ratings in the neighborhood of 125 per cent. so as to include at that end of the line a disproportionately large number of doubtful risks. We believe that this tendency to introduce into the membership of the Company borderline and doubtful risks can be kept better under control through the operation of the numerical method than without it and that indeed one of the important advantages of the method is the greater accuracy with which these borderline risks are valued and placed where they belong.

CONCLUSION

As we have already said, our object in preparing this paper is to describe the numerical method and to publish the basic ratings of build and family history in such form as to be readily available. We believe that the use of basic ratings in the routine practice of the life companies throughout the country would be a marked advance over the present method of determining the significance of those factors. It will take but little experimentation to demonstrate the soundness of this claim. It is by no means difficult to make the experiment which we made before our Company adopted the method, namely, of running the two methods side by side for a few months. This has been done by other companies who were averse to giving up the old method and, we are informed, has proven the distinct advantage of a numerical system. The judgment of the medical selector is greatly steadied and his conclusions are more accurate with the help of these standards than without them. The entire plan of valuing lives for insurance need not be introduced all at once in any office. When

the selector is passing judgment upon the factors of build and of family history alone he needs the steadying influence of standards even if he makes no other use of them.

Finally we should like to say that,

1. We do not believe that the whole truth is included in the numerical system as now practiced or that it cannot be changed to advantage in many of its details. In fact, we stand ready to modify our present views in the light of new evidence.

2. We do not believe that the system is theoretically correct at all points, but we agree fully with the actuary of one of the large companies who employs the system when he says that the numerical system can be criticized freely from the theoretical standpoint, but in practical use it is a powerful aid in the selection of risks for insurance.

Mr. Moir—We anticipate a considerable amount of discussion of this paper. I propose to call first upon a medical man and then upon an actuary, so that we will have the discussion fairly interspersed. Dr. Knight will lead the discussion.

Dr. Knight—These two men, Dr. Rogers and Mr. Hunter, and the Company they represent have in the contents of this paper generously given to us a tremendous amount of most valuable information that it has taken years of study and of skillful oversight and an expenditure of large amounts of money to obtain. And now as I have read and reread it very carefully, the most emphatic impression that I have formed is that no one (whether actuary or medical director) should go home from these meetings without a clear sense that it is from now on his duty, and the duty of his Company, and a necessity in the way of fair dealing with applicants, to try to measure correctly the mortality worth of all who ask for insurance and then to give them a form of insurance and at a cost that are fair to both Company and applicant. They have demonstrated that the ratings can be made and followed safely and with about as even an experience where they run above 125%

as below it; and it seems to me that none of us should henceforth refuse to consider and to insure lives that are at least to a moderate degree sub-standard. I know that the agencies of some Companies are opposed to it, but is not a prominent reason that they now can get standard policies issued on lives where they would be unobtainable if the Company issued sub-standards? And have not the executives of Companies failed to issue sub-standard insurance because they have not known that it can be done with perfect safety and because they have thought that it was easier not to do so?

For the past ten years actuaries and medical directors have discussed and criticized the system of numerical rating of risks as practiced by the New York Life Insurance Company. Some of the views have been favorable, some decidedly unfavorable, some have rather clandestinely obtained and have been using in their own home offices the actual tables that the New York Life has built up out of its long and many experiences for its own use; others have decried the delegation of the rating of risks to clerks, have pointed out the inconsistencies and errors of following blindly the system of credits and debits for favorable and for unfavorable features reaching results that without the judgment of an expert medical selector would be grossly wrong; and some have found particular fault with the results of raising the age to make the policies sub-standard, the contention being that "the original assumptions are not followed out in practice in case of lapse or surrender and not always in the distribution of dividends." But brief reflection shows that these latter criticisms are for the most part not of the system or principle of Numerical Rating of the mortality worth of the risks but rather of the way the cases are handled after the ratings have been determined.

We know and we must keep in mind without confusion that in placing insurance upon lives there are two separate and distinct problems that have to be solved—First, what rate of mortality will cover the risk in question? Second, with the rate of mortality determined what practical disposition will be made of it?

Now this paper under discussion deals only with the first question, but we have to think too of the second one for it is probable that a Company's method of determining the value of the individual risks might be modified very materially by their method of treating the individual risks after the value is determined. For instance, the numerical method as outlined by Dr. Rogers and Mr. Hunter, determines the percentage of the normal for each risk and in the six cases quoted gives values ranging from 85% to 215%. If the practical treatment of risks is such as to take cognizance of small variations in the percentage, some method of rating is necessary which reflects such small differences, whereas if the method of treatment deals only with larger sub-divisions, then such close methods of refinement would not seem to be absolutely necessary, although they may be valuable. According to our understanding, the method of the New York Life is somewhat a combination of the two. The broad classification is adopted when the total rating is less than 125%, while above that special ratings are made for each 5% addition, or else extra premiums are charged. Under Maximum Rating for Standard Risks, Dr. Rogers and Mr. Hunter state:

"The considerable proportion of risks rated at 80 per cent. on the one hand is offset by a corresponding proportion of risks rated at 120 per cent. The proportion of risks at 85 per cent. is offset by a similar number rated at 115 per cent., and so on. The problem then is for each Company to determine at what point it should fix the limit of its standard class. In our own Company that limit is fixed at 125 per cent. in general. In the practical use of this limit care must be taken to guard against the natural tendency to shade the ratings in the neighborhood of 125 per cent. so as to include at that end of the line a disproportionately large number of doubtful risks."

Under this method, if the numerical rating showed an expected mortality of 120% or 125%, the risks would generally be given standard policies, whereas if the rating showed 130%,

there would be a small advance in age. If the rating showed 135% or 140%, there would be a further advance in age, while a rating of 215% would result in a very material increase in age.

In the Company with which I happen to be associated, we generally follow the same broad classification in giving standard policies to risks that show a mortality up to 125%, but above that rating we do not differentiate as closely as the numerical system of the New York Life permits. It happens that with our Company doing an Industrial and Intermediate business we are constantly dealing with groups showing higher mortality. We have our Intermediate table for the higher grade of Industrial risks, and those Intermediate rates provide for a mortality of 150% thus covering the risks from 125% to 175%; and then too we have our Special Class rate with a mortality of 200% that takes care of the cases from 175% to 225%. Thus we have cared for all of our ordinary standard and substandard risks up to an expectation of 225% by placing them in one of these three broad classifications. Dr. Rogers and Mr. Hunter say "that the proof of the pudding is in the eating" and you will see by this statement of our Special Class experiences during the past ten years how satisfactorily and evenly that has gone along. The five groups embrace 90% of the total Special Class business, and you will note how even the experience has been year by year with each one of those groups. All have proven themselves to be sub-standard, and yet the percentage of actual claims to the probable has been continuously steady and within the limits of safety. The totals for the thirteen groups exhibited in the last column show year by year a percentage less than 69 only once, and more than 72 only once. The percentage of actual to probable for the 10 years measured by the Special Class Tables is 70, and we have learned during the 20 years that the Company has written Special Class insurance that the experiences with these impaired lives with their mortality expectations from 175% to 225% go along just about as evenly and just as safely as they do with the standard lives where a death rate of less than 125% is expected.

METROPOLITAN SPECIAL CLASS EXPERIENCE

All Years or Issue During Year of	FOR						TOTAL—13 GROUPS					
	LIQUOR DEALERS		FAMILY HISTORY		IMPAIRED HEART		PERSONAL HISTORY		OCCUPATION			
	Mean No. at Risk	Per Cent. of Actual to Probable	Mean No. at Risk	Per Cent. of Actual to Probable	Mean No. at Risk	Per Cent. of Actual to Probable	Mean No. at Risk	Per Cent. of Actual to Probable	Mean No. at Risk	Per Cent. of Actual to Probable	Mean No. at Risk	Per Cent. of Actual to Probable
1908	7,120	74	4,816	58	2,428	88	1,994	64	1,370	78	19,471	69
1909	8,282	75	5,578	42	2,771	76	2,289	41	1,410	94	22,524	65
1910	9,478	74	6,147	72	3,130	144	2,517	58	1,595	48	25,386	78
1911	10,609	75	6,672	63	3,456	85	2,933	40	1,803	74	28,535	69
1912	11,814	67	6,861	72	3,799	70	3,474	65	2,103	85	31,447	71
1913	12,995	71	7,030	65	4,032	84	3,967	45	2,554	76	34,222	68
1914	14,258	72	7,181	57	4,184	82	4,408	72	2,926	49	37,534	63
1915	15,463	70	7,286	57	4,404	90	4,546	68	3,076	57	40,765	72
1916	15,463	76	7,401	61	4,824	94	4,822	68	4,048	57	40,765	72
1917	16,891	79	7,662	51	5,431	74	5,353	76	5,349	62	45,436	70
19 Years 1899-1917 Accumulated Experience	144,044	71	82,011	63	47,270	92	42,759	63	29,285	62	383,731	70
1918	18,132	91	8,057	80	6,348	117	6,128	82	7,744	101	51,473	92

10 YEARS (1908-1917) SHOWING THE FIVE LARGEST GROUPS (THE FIVE GROUPS REPRESENT APPROXIMATELY 90 PER CENT. OF THE TOTAL)

19 YEARS (1899-1917) SHOWING THE FIVE LARGEST GROUPS (THE FIVE GROUPS REPRESENT APPROXIMATELY 90 PER CENT. OF THE TOTAL)

AND TOTAL.

(ACCUMULATED EXPERIENCE DURING 1918 SHOWING THE FIVE LARGEST GROUPS AND TOTAL)

We have no reason to be dissatisfied with our method of rating all these cases and placing them in three broad classifications, but I do think that now with the valuable data given to us by these men we should all get together and try to standardize and to adopt such similar methods as will permit us to compare results.

Mr. Henderson—The Company with which I am associated adopted the numerical method of rating risks in its entirety a little more than three years ago. At that time we had been writing sub-standard business definitely for somewhat over sixteen years and had in that time an opportunity to learn in a practical way some of the reasons why a change of method was desirable. Sub-standard business by its very nature directs the mind to a determination, as precise as our knowledge of the facts and of their meaning renders possible of the degree of extra hazard in each case. On the score of mere consistency also it imperatively demands the formulation of rules to be followed, unless good and sufficient reason can be shown for a different course, in the rating of those impairments sufficiently serious to disqualify for standard policies and sufficiently common to be met with repeatedly. With the accumulation of experience and expansion of the business these rules naturally become more numerous and more elaborate to an extent requiring a systematic index. They are also necessarily expressed numerically because they must finally be given effect in modifications of premium rate or of benefits granted. On the other hand, for a company which does not transact sub-standard business the rule for these impairments is not at all numerical but is as simple as that of the Queen of Hearts in "Wonderland" whose favorite prescription for those who displeased her was "Off with their heads."

Possibly this distinction has created in some minds the impression that the numerical method of rating, while probably valuable for a company doing a considerable sub-standard business, is of comparatively little use to a company doing only standard business. Such a conclusion is, however, not warranted because such a set of rules as I have described,

however extensive and however carefully indexed it may be, does not in itself constitute the numerical method of rating, properly so called. It is not even a necessary part of that method except for a company transacting sub-standard business.

The essential features of the method as I understand it are as follows:

(1) A schedule expressed in a numerical scale of the expected effect on the mortality experience, of the various conditions, favorable or unfavorable, likely to be found in cases falling within the range of possible acceptance in some form by the Company. (For conditions which would in themselves take a case outside that range that fact only need be noted.)

(2) An arithmetical rule for combining the numbers corresponding to the different features of each case into a single amount which may be used as an aid in determining the action to be taken.

These two features are of as great importance and value in connection with standard insurance as with sub-standard insurance, possibly greater. Their adoption has in our case produced the following results:

(1) A large percentage of the cases is passed on by lay clerks in the Medical Department thus allowing the Medical Directors to give more and better attention to the doubtful or otherwise important cases and also permitting the same number of Medical Directors to dispose of a much larger volume of business than would otherwise have been at all possible.

(2) The action of the different Medical Directors on similar cases has been made much more consistent.

(3) It is possible to modify if desired the severity of selection generally without endeavoring to reconstruct the point of view of the individuals passing on risks.

(4) As a particular case of the above the selection can easily and automatically be made more severe for large amounts than for small.

Our opinion of the method, after three years' trial, may be summarized by saying that we tried it first—as an experiment

probably worth making and it is now a regular part of our system not to be abandoned until something better is presented to take its place.

Among the classes for which it had been found necessary to lay down rules for rating were, naturally those of heavyweights and lightweights who were outside the range of acceptance at standard rates and although, like some other companies, we had printed in our rate books the table of heights and weights compiled by Dr. Shepherd, which varies according to age the light of experience indicated that a fairly equitable and at the same time simple rule for heavyweights could be laid down, if the percentages of departure were measured from a standard uniform for all ages instead of from that table. We accordingly adopted as such standard the figures given for ages 35 to 39 in Dr. Shepherd's table.

At that time our practice was to provide for extra mortality by rating up the age and the rule was naturally in the form of years added to the age in terms of percentage of overweight. We later, however, discontinued rating up the ages and used instead scales of extra premiums calculated to cover percentages of extra mortality. The rule was accordingly converted into that form with the result that when we finally decided to adopt the numerical rating method we had already in use a section of a table of mortality ratings for build, based on a single build table, which was incorporated with slight modifications into our system. Recently we modified our standard build table slightly so that it now agrees exactly with the scale for male lives at ages 35 to 39 given in Part I of the M.-A. report instead of with Dr. Shepherd's figures.

It may be well to explain how it is possible to have a table of mortality ratings based on a single build table which will be equivalent to another table based on a set of build tables arranged by ages. This possibility depends upon the similarity of the build tables at the different ages. For example, if by taking 117.3 per cent. of the average weight for each height at age 15 we arrive at the standard weight for that height, then it is evident that for each percentage under or over the stand-

ard weight there will be a corresponding percentage under or over the average weight which will be independent of the actual height. Thus 25 per cent. under the standard will correspond to 12 per cent. under the average, 10 per cent. over the standard will correspond to 29 per cent. over the average and 50 per cent. over the standard will correspond to 76 per cent. over the average. From a set of mortality rates based on one scale it is therefore easy to pass to a set based on the other. The required similarity of the sectional build tables, while not exact, is sufficiently close for all practical purposes and the following list of proportions for different ages has been derived by combining the weights for heights 5 ft. 7 in. to 5 ft. 10 in. inclusive.

Age	PERCENTAGE OF	
	Average to Standard	Standard to Average
15	85.3	117.3
20	91.5	109.2
25	94.7	105.6
30	96.7	103.4
35	98.7	101.3
40	100.6	99.4
45	101.9	98.2
50	102.5	97.6
—	—	—
35-39	100.0	100.0

The single standard for build was not adopted by us on the theory that it represented the best weight from the standpoint of mortality at all ages although it did in a sense originate in the idea that an approximately uniform percentage of excess over that scale represented the limit of standard insurance. In fact, when we first prepared a complete schedule of mortality ratings for build the best weight according to it was slightly above the standard at the young ages and slightly below at the old. We are consequently not concerned about the possibility of conditions so changing in the future that the best weight

would not agree with our standard. The average weight might equally vary from the present scale. What we were seeking was an arrangement which would simplify as much as possible the routine work of the rating desk and so expedite the work. This our plan accomplished to a greater degree than we had counted upon because the simplicity of the arrangement enabled our Medical Department to devise a mechanical aid for the clerks which has been of great value in increasing speed and at the same time reducing mental effort and possibility of error.

I have prepared and append to this discussion tables of basic mortality ratings, additional ratings for consumptive family history and corrections for short endowments on the basis of the single standard for build which are equivalent to those given by Dr. Rogers and Mr. Hunter. An examination of the first of these discloses two rather remarkable results; the standard weight is apparently the best weight for all ages and for the entire heavyweight side of the table the ratings are independent of the age.

Theoretically the debits and credits for short and tall men and for abdominal measurements should also be corrected similarly but the corrections would be small and the allowances themselves are not yet very definitely determined so I would suggest that the allowances given in the paper for heavyweights which are independent of age, might safely be applied to the single standard, leaving only the young underweight corner to be modified.

In the case of women the fact that the average weight—for height—is less than among men at certain ages might be taken care of by preparing on similar principles a special table of mortality ratings to be used along with the standard build table. The same final result may, however, be accomplished by an adjustment to the weight of women at those ages before entering the build table. Theoretically this adjustment should be a percentage added to the actual weight and varying with the age. For example; if the average weight of men at age 20 is 2.8 per cent. higher than that of women of the same height,

then the departure of the weight of any women in particular from the average weight for women is the same as the departure of the weight of a man weighing 2.8 per cent. more than she does from the average weight for men. If we assume therefore, as do the authors of the paper, that the same table of mortality ratios may be applied to women as to men provided the percentages of departure are measured from their respective averages it follows that we may determine the mortality ratios for women by first applying the correction to the weight and then proceed as for men. A percentage correction to the weight, however, has practically no effect on the mortality ratio if the weight is near the standard and comparatively little effect if the weight is below the standard. Satisfactory results may accordingly be secured in practice by using instead a correction in pounds so determined as to be correct for a fairly substantial degree of overweight and applying it only to those who are overweight. The following schedule shows the percentage correction determined from a combination of the weights from 5 ft. 3 in. to 5 ft. 6 in. inclusive and a suggested scale of corrections in pounds which would correspond with the percentages for an actual weight of about 180 pounds or about 30 per cent. above standard weight.

Age	Percentage Men to Women	Correction in Pounds
15	100.0	..
20	102.8	5
25	104.2	8
30	104.3	8
35	103.1	6
40	102.1	4
45	101.4	2
50	100.0	..

The ratings for some impairments other than tubercular family history are materially affected by the build of the applicant and must accordingly be harmonized with the build table

CORRECTION FOR ENDOWMENTS MATURING UNDER AGE 55

TUBERCULOSIS IN FAMILY RECORD ADDITIONS
TO BASIC RATINGSONE DEATH FROM TUBERCULOSIS
PERCENTAGE DEPARTURE FROM STANDARD WEIGHT

Age	-35	-30	-25	-20	-15	-10	-5	0	+5	+10	+15
15	60	50	40	35	30	25	20	10	10	5	0
20	55	50	40	30	25	20	15	10	10	5	0
25	45	40	35	25	20	15	15	10	5	5	0
30	40	35	30	25	15	10	10	5	5	0	
35	30	25	25	20	15	10	5	5	5	0	
40	25	20	20	15	10	5	5	0	5		
45	20	15	10	10	10	5	0				
50	15	10	5	5	5	0					
55	10	5	5	0	0						
60	10	5	0								

TWO DEATHS FROM TUBERCULOSIS
PERCENTAGE DEPARTURE FROM STANDARD WEIGHT

Age	-35	-30	-25	-20	-15	-10	-5	0	+5	+10	+15
15	80	70	65	55	40	30	25	15	10	5	0
20	80	70	60	50	40	30	20	15	10	5	0
25	65	60	50	45	35	25	20	15	10	5	0
30	60	55	45	40	30	20	15	10	5	0	
35	50	45	40	35	25	20	15	10	5	0	
40	40	35	30	25	15	15	10	5	0		
45	30	25	20	15	10	10	10	5	0		
50	25	20	15	10	5	5	5	0			
55	20	15	10	5	5	5	0				
60	15	10	5	0	0	0					

THREE DEATHS FROM TUBERCULOSIS
PERCENTAGE DEPARTURE FROM STANDARD WEIGHT

Age	-35	-30	-25	-20	-15	-10	-5	0	+5	+10	+15
15	90	80	75	60	50	35	25	20	15	10	5
20	90	80	70	60	50	35	25	20	15	10	5
25	75	70	60	55	45	35	25	20	15	10	5
30	70	65	55	45	35	25	20	15	10	5	0
35	60	55	45	40	35	25	20	15	10	5	0
40	45	40	35	30	25	20	15	10	5	0	
45	35	30	25	20	20	15	10	5	5	0	
50	25	20	15	10	10	5	5	5	0		
55	20	15	10	5	5	5	0	0			
60	15	10	5	0	0	0					

Dr. Symonds—This paper of Mr. Hunter and Dr. Rogers is a splendid exposition of a scientific method for the selection of sub-standard risks. It is hardly possible to conceive of any method other than this which will do such service accurately. The old English method of rating sub-standard risks by rule of thumb seems pitifully inadequate. Perhaps it secured satisfactory results but the conclusions reached in individual cases are quite incomprehensible often times. By the method of the New York Life a solid foundation is laid for the accurate selection of such risks.

The advisability of applying it to the selection of standard risks is another matter. The authors claim for it:

- (1) Greater uniformity
- (2) Diminished error
- (3) Action of laymen
- (4) Greater accuracy in border-line cases
- (5) Greater speed

(1) So far as uniformity is concerned, is it not to a large degree a mechanical uniformity which does not recognize for example the varying ability of different examiners? This certainly is a most important matter especially in border-line cases. The report of mitral regurgitation without hypertrophy by a skilled experienced examiner should receive a different rating from one made by an inferior country practitioner who is an examiner only because there is no other M.D. within a radius of twenty miles. Curiously in this case the report of the expert should make the rating higher for the diagnosis is probably accurate while the isolated country doctor has about an even chance of reporting a non-valvular or a cardio-respiratory murmur as mitral regurgitation. As another example the occupation of farmer entitles the risk to a credit, but this should not be the case if he has a valvular murmur with hypertrophy. In fact it should then be a demerit. Now it is more than likely that such inconsistencies are properly cared for in the New York Life office but there is no evidence of it in this paper. Their very existence shows the need of something more than mechanical uniformity. In fact the absence of any

reference to the varying ability of different examiners is a serious defect in the method.

(2) If by the term "error" is meant such clean-cut mistakes as overlooking "total blindness" or a pulse-rate of 95, the method does not seem to afford any great advantage. If each case is rated by two clerks independently then the liability to such errors is greatly diminished but this has nothing to do with numerical rating.

(3) There is no need to resort to numerical rating in order to secure the action of competent skilled laymen in the selection of risks. In my own Company, the Mutual Life, 53% of the applications are accurately approved by lay clerks who have never seen the inside of a medical school. The method is very simple. A skeleton examiner's report is furnished to the lay checker which sets forth the answers required. The great majority of these is "yes or no," and any marked qualification sends the case to the Medical Department. In the matter of weight a table is furnished showing the limits of their action for each weight and age. Similarly for such conditions as pulse-rate and specific gravity of the urine, upper and lower limits are set. The family history must not include a case of tuberculosis nor two cases of apoplexy, heart disease, diabetes, insanity, epilepsy or cancer, and it must not be short-lived. The personal history of disease is covered by a series of tables giving the minimum time which should elapse since occurrence. The amount is restricted to \$10,000. This arrangement also disposes of the claim for greater speed in handling applications and it gives the Medical Board ample time for the proper scrutiny of the other applications. Similar arrangements are in vogue in other offices.

(4) There remains the claim of greater accuracy in rating border-line risks. These are not very numerous, even though they are very annoying. Probably between 5% and 10% of the applications submitted to a Company issuing only standard policies fall into this category. In my Company 53% are approved by lay checkers, 5% are disapproved by the medical examiner, leaving 42% which have to receive careful scrutiny

by the Medical Board. Three out of four of these fall promptly among the goats or sheep. There remains then 10% of border-line risks. Does it seem advisable to install the cumbersome machinery of numerical rating for all applications in order to arrive at greater accuracy for this 10% of border-line risks? Most certainly no, for numerical rating would materially delay the present swift and accurate approval of 75% of the applications. On the other hand, is it advisable to apply numerical rating to these cases about which the Medical Director may be in doubt? The authors give in the opening paragraph of their explanation an instructive description of the gyrations of a medical director's mental wheels when he strikes a case of this kind. It is accurate except that all reference to the medical examiner is omitted. But if the medical director has a correct idea of the mortality ratio which accompanies the applicant's physique, he can allot the proper significance to the other factors with a promptness which can hardly be found in the system under discussion. An experienced medical director will make this estimate quite accurately, without any numerical rating to help him except the basic mortality ratio due to physique. An inexperienced medical director would doubtless get great help from the numerical rating of all his risks but a small amount of practice would soon enable him to dispense with it in 75% of the applications, and that percentage would increase rapidly up to 90%, if his company issues no sub-standard policies. The usefulness of numerical rating to a company issuing only standard policies is negative in 90% of the risks and of doubtful value for the other 10%, excepting the basic rates for physique.

As no medical director knows, however, when his company will begin to issue sub-standard policies, let us examine in some detail the splendid feast of numerical ratings which Mr. Hunter and Dr. Rogers have laid before us. This system is the only one which can properly rate sub-standard risks and all other methods must go down before it.

The table of ratings for physique is a substantial improvement over that of the Joint Committee. As I am a member of

that Committee, this statement may seem disloyal but I have excellent company. Like most peace treaties, the Committee's ratings were a compromise but the majority favored blue and we generally compromised on blue. I disliked it so much that I never urged it upon my own Company. The method described of applying these ratings seem to be very complicated. A reference first to one table to find the percentage of weight in terms of average weight and then to another table to find a mortality rating for the percentage seems to double the work needed for both items can be easily combined in one table.

It does not seem reasonable to suppose there is any material difference between men and women in the laws governing the influence of physique on mortality with one important exception. Women have about one inch more of fictitious height than men due to the heels and the hair. The same ratings should be given to a woman of 5 ft. 6 inches as for a man 5 ft. 5 inches.

While the authors say that the ratings for abdominal girth in overweight are provisional, they probably approximate the truth quite closely.

The section referring to Family History other than tuberculous really gives only half the truth, for it covers only the difference between a long-lived and a short-lived family history. One of the authors told me of his scheme for grading family histories ten or twelve years ago. It sounded attractive and I tested it at once. All the men in my Company who were interested in the selection of risks helped in this grading, also some in other companies and even a few of our Hartford friends. Five hundred family histories were graded numerically. This numerical grading extended from 100 for the best down to 40 for the worst according to the votes of 20 men qualified in selecting risks. The material was divided into 4 even groups, compassing 15 points each. The best included those from 100 to 86, the next from 85 to 71, the next from 70 to 55 and the worst from 54 to 40. The difference between the mortality of the best group and that of the worst was over 60% instead of 30%. These mortalities were recalculated in 1916 with a few years' added exposures and the results are as follows:

MORTALITY EXPERIENCE OF 500 SELECTED LIVES

ISSUES OF 1880 TO 1890—EXPOSED TO 1915—BY THE M.-A. TABLE

Family History	Grading	Entrants	DEATHS		Mortality Ratio
			Actual	Expected	
Best	100-86	103	18	30.46	59.0%
Average	85-71	150	36	38.86	92.5%
Poor	70-55	182	44	37.48	117.5%
Worst	54-40	65	20	16.35	122.4%
Total		500	118	123.15	95.8%

The difference between the best and the worst is 63% instead of 30%. The reason is that we intentionally picked out some very good family histories and as many very bad ones as we could find. Doubtless every very bad non-tubercular family history between 1880 and 1890 in my Company is included in this list. The result is that even the poor group is a long ways below the average group and not far above the worst. If the two lower groups are consolidated there are 64 actual and 53.83 expected deaths, giving a mortality of 118.8% which is 60 points worse than the best group. Now 64 deaths constitute quite a respectable number for comparison with other groups which are homogeneous in everything excepting the family history. In a paper which I presented to our Association in 1912, there was an elaborate analysis made with regard to the difference between long-lived and short-lived family histories. In the long-lived families both parents attained 70 and in the short-lived families both parents died below 60. All tuberculous elements and all marked evidence of degenerative taint such as two cases of apoplexy, heart disease, insanity, epilepsy, diabetes, and cancer were excluded. This analysis of reasonably pure, untainted families showed that the long-lived family gave a mortality of 86.8% and the short-lived family one of

110.4%, a difference of nearly 24 points. This agrees quite closely with the 30 points which separate—in the opinion of our authors—the best family history from the worst, but they have overlooked entirely the matter of taint in the family record. One family taint which affects the younger ages particularly is that of tuberculosis. In the paper referred to above a very large group of risks, who had lost one brother or sister by tuberculosis was analyzed with reference to the influence of longevity in conjunction with this mild manifestation of tubercular taint. The results were as follows:

ISSUES OF 1885 TO 1908—EXPOSURE OF 1885 TO 1909

ONE BROTHER OR SISTER DEAD OF TUBERCULOSIS
LONG-LIVED FAMILY HISTORY. BY THE M.-A. TABLE

Ages at Entry	Number of Entrants	Exposures	DEATHS		Ratio
			Expected	Actual	
All Ages	3,141	20,568	253.7	199	78.4

LIGHTER WEIGHTS—BUILD—GROUPS 6, 7, 8, 9

15-19	—	—	—	—	—
20-29	54	475	2.2	3	136.5
30-39	433	2,914	18.9	30	158.7
40-49	441	2,988	31.9	24	75.1
50-59	182	1,143	27.7	20	72.2
60 & Ov.	35	203	9.9	4	40.4
Total	1,145	7,723	90.6	81	89.1

HEAVIER WEIGHTS—BUILD—GROUPS 0, 1, 2, 3, 4, 5

15-19	—	—	—	—	—
20-29	58	322	1.5	—	—
30-39	601	4,118	26.4	19	72.0
40-49	872	5,504	61.6	42	68.0
50-59	412	2,574	57.3	45	78.8
60 & Ov.	53	327	16.3	12	73.6
Total	1,996	12,845	163.1	118	72.3

SHORT-LIVED FAMILY HISTORY

All Ages	1,056	6,634	59.2	79	133.5
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LIGHTER WEIGHTS—BUILD—GROUPS 6, 7, 8, 9

15-19	8	34	—	—	—
20-29	125	750	3.3	9	272.7
30-39	157	1,042	6.7	5	74.5
40-49	122	817	8.3	10	120.0
50-59	28	205	4.8	6	124.8
60 & Ov.	4	16	1.0	2	200.0
Total	444	2,864	24.1	32	132.8

HEAVIER WEIGHTS—BUILD—GROUPS 0, 1, 2, 3, 4, 5

15-19	1	1	—	—	—
20-29	92	596	2.6	6	231.0
30-39	248	1,516	9.2	18	196.2
40-49	195	1,226	12.5	13	104.0
50-59	64	381	8.8	7	79.8
60 & Ov.	12	50	2.0	3	150.0
Total	612	3,770	35.1	47	134.0

Nine out of ten of us sitting here have had at some time an attack of bacillus tuberculosis. In very few has the attack progressed beyond some slight symptoms which were not recognized as caused by the bacillus tuberculosis. These statements, which could be confirmed post-mortem, indicate clearly that when the attack develops to a point where it is surely diagnosed as tuberculosis, some other factor than the bacillus tuberculosis has taken part. In life insurance most of us firmly believe that this determining factor is inheritable and represents a family taint. This belief is also held by biologists in general, as set forth in a recent letter of Prof. Raymond Pearl, who is the head of the department of Biometry and Vital Statistics in Johns Hopkins University. He says, "Altogether

I feel that we must and will, as time goes on, give more and more attention to the constitutional or hereditary factor in disease. With the development of bacteriology which went with such tremendous strides in the late eighties and early nineties, the pendulum of medical opinion swung high away towards the infection side, and physicians more and more tended to forget that the constitution of the individual in a biological sense was still a very important factor, both in determining whether he got infected and in determining what happened to him if he did get infected. I am convinced that the older medical literature, particularly that of tuberculosis, was in some respects much saner and sounder in its views than much of the present-day writing."

Some diseases in the family other than tuberculosis seem to have a marked effect upon the mortality of the succeeding generation. In the Medico-Actuarial Investigation we analyzed a number of these. In two cases the results were striking, even though no effort was made to determine whether the family as a whole was long-lived or short-lived.

Where the family history showed two or more cases of apoplexy or paralysis, the mortality was 126% for ages at entry 15 to 39, as compared with 108% for the whole class and there were 91 deaths in the ages 15 to 39. The death rate from cerebral hemorrhage, apoplexy, paralysis, and suicide was twice the normal.

Where the family history showed two or more cases of heart disease, the mortality was 124% for ages at entry 15 to 39, as compared with 113% for the whole class and the number of deaths was 76 in the ages 15 to 39. The death rate from organic diseases of the heart was distinctly above the normal.

In both these classes, the probable explanation of the very high mortality in ages below 40 is that one or both of the parents died of the disease and probably below 60 years of age in a considerable proportion of the cases. The inheritable taint, therefore, was associated in part with a short-lived family history and this combination caused a mortality 26 points above the average in one class and 24 points in the other.

Whether this inheritable taint is gout or syphilis or something entirely different cannot now be determined for the data are insufficient. For life insurance we should reckon that a short-lived family history associated with a marked inheritable taint may cause a mortality of 30 points above the average instead of 15. Similarly an extraordinary longevity may entitle a risk to a credit of 20, 25, or 30 points. The range then between the very best and the very worst family history, free from tuberculosis, is probably 55 or 60 points instead of 30.

Undoubtedly childbirth as a cause of death of the mother is used as a subterfuge for tuberculosis in a good many cases as our authors state. Since it must occur before 45, it has a tendency to diminish the longevity of the family and some significance should therefore be attached to it in all cases.

Neither my time nor your patience will permit any detailed discussion of the ratings for a tuberculous family history. Proper significance seems to have been given to the factor of weight. The authors draw attention to the fact that a credit of 15 points should be given when the family is long-lived in spite of the tuberculous elements, and similarly a debit of 15 points should be charged when the family is short-lived in addition to being tuberculous.

We all sympathize with them in their difficulties of rating habits in the use of alcohol. The debit of 25 to 50 points seems rather large if the interval of ten years has been one of total abstinence, especially if the examination was made by a high-grade examiner.

The debits for mitral regurgitation ought to be immensely modified by the ability of the medical examiner reporting. It is now well known that many apex systolic murmurs are non-valvular in origin and of no pathological consequence. These ratings are based upon the reports of the average medical examiner and doubtless in many of the cases reported with only slight hypertrophy or none at all the murmur does not signify true mitral regurgitation. A highly competent medical examiner would show much higher ratings than the ones given.

The debit of 50 to 100 points for intermittent glycosuria if

clearly without diet or treatment is of profound importance. This is a more serious condition than had been imagined. The papers now appearing in the medical journals on the lowered renal threshold for sugar are very misleading, for they assume in most cases that the condition is not of gravity. Certainly if it leads to a mortality twice the normal, it is very grave whether these cases ultimately become diabetics or not.

The reviewer feels that he has drawn attention to some little fly-specks upon a splendid piece of work of the highest grade and skill. They can be easily removed or perhaps they will be found to be real beauty-spots instead of blemishes. But he knows and asserts that underneath all there is the finest piece of workmanship which life insurance has brought forth in thirty years. This work of numerical rating is a monument to Rogers and Hunter, more enduring than brass and more lasting than marble. They will be blessed by millions of people who have reaped the benefits of their foresight and skill. Let us give them all praise.

Mr. E. E. Rhodes—Many, if not all, of us have awaited eagerly the time when Dr. Rogers and Mr. Hunter would find it convenient to place before us a more detailed exposition of the numerical method of determining the valuation of risks for insurance than has heretofore appeared. Their standing in life insurance circles is so high that in approaching a discussion of the subject I am instinctively cautioned to proceed with great care lest I unconsciously make evident the gulf which separates me from them.

The subject has been discussed twice in the proceedings of the Actuarial Society, but neither time has there been sufficient data presented to the members to enable some of us to form a really intelligent idea of what we were attempting to discuss. Dr. Rogers and Mr. Hunter have relieved us in a great measure from this embarrassment.

It is clear that the plan should be of great value to companies doing a substandard business, granting that it is scientific and workable. Its value to companies which do not do an under average business is not so apparent. For all practical

purposes, it is sufficient to divide the risks submitted to the latter companies into three classes, acceptable, doubtful, and not acceptable. Clearly acceptable cases require very little time for their consideration—not as much time on the average—I suspect—as it would require to tabulate the numerical values. The Mutual Benefit declines about seven per cent. of the business submitted to it. A very large number of these declined cases are clearly not acceptable, and the tabulation of the numerical value is unnecessary. In a comparatively small proportion of the cases which we now decline it might be found by the use of the numerical method that the cases were really acceptable. I can also see that in the small proportion of doubtful cases, granting what I have already said, the numerical method might be of value, but I cannot see wherein it would expedite our business to apply the numerical method to every case submitted to us, or wherein our selection would be any more intelligent in the case of, say ninety-five per cent. of our business. The question then arises, would the application of the numerical method to the remaining five per cent. of our business be of value? Before proceeding to the consideration of this question, I would like to say that in my opinion a tenth factor should be added to those noted by Dr. Rogers and Mr. Hunter, *i.e.*, the amount of insurance applied for. While I readily admit that from the medical aspect a man who is good for \$25,000 of insurance should be regarded as equally good for \$50,000, nevertheless in daily practice we throw logic to the winds, and now and then hedge a little on our bets.

The illustrations of the practical application of the numerical method which appear in the paper are very interesting. It may also be interesting if we take these illustrations apart and, after changing them around a little, put them together again. We will take the carpenter and make him a bank officer and reduce his height to five feet, but leave him twenty-five per cent. underweight. We will also assume that he is applying for a Twenty Payment Life policy. The total value of the risk becomes 120 instead of 160. This seems a low rating for a man of 30 engaged in a sedentary occupation, who is twenty-

five per cent. underweight, and whose father died of consumption. I note that the rating for weight and height is one hundred and five, and that he gets a credit of ten points on account of his occupation, which seems strange when the occupation is considered in connection with his weight and family history.

In the second case we will also turn the butcher into a bank officer, but otherwise leave the record as it is, except that we will assume that he applies for a Twenty Payment Life policy instead of a Fifteen Year Endowment policy. The total value of the risk will then be 105 instead of 130, which again seems a little strange when the occupation and overweight are considered, for it is known that bank officers live pretty well and those who are stout are likely to grow stouter with increasing years.

In the third illustration we will not change the man further than to assume that he is thirty per cent. underweight, instead of ten per cent. The total value of the risk will then be 105 instead of 85, and according to this valuation he should be acceptable. If there had been a recent loss of weight, however, the case would not be acceptable. This factor does not enter into the valuation.

In the fourth illustration we will leave the bank officer unchanged, except that we will reduce his height to five feet and assume that he applies for a Ten Payment Life policy. The total value of the risk will be 125 instead of 145, which seems a low value for a man aged fifty, who is forty per cent. overweight.

In the fifth illustration we will make several changes. We will make the jeweler a bank officer, change his height from five feet ten inches to five feet eight inches, make him ten per cent. overweight instead of twenty per cent., give him an excellent family history instead of a rather good family history, assume that his habits regarding alcohol have always been good, and that he applies for a Twenty Payment Life policy. The total value of the risk will be 110 instead of 195, but this seems a low valuation for a man with a record of syphilis.

Let me hasten to say that I have not overlooked the paragraph in the paper regarding restriction of credits, which is applicable to all of my rebuilt illustrations. If the method is a scientific one, as its authors claim, why are not the valuations shown in my changed illustrations as reliable as those shown in the original illustrations? What assurance have we that if mine are wrong the others are right? Mr. Macauley was standing on very solid ground in 1911 when, discussing the numerical method, he said that one method of testing any principle or system is to apply it to extreme cases. The validity of any scientific law is dependent upon the universality of the formula. In my illustrations I have not sought extreme cases, but is it not clear that even in these cases we are forced to resort to what the authors of the paper call the empirical system to determine the acceptability of the risk?

Take the case of the boy of 15, who is five feet high, and who is forty-five per cent. overweight. His basic rating is 125. He would have a credit of ten points on account of his height, but disregarding this and any other credits, he would be acceptable under the numerical method for an Ordinary Life policy. How many of us would give it to him?

While preparing this discussion I was called upon to pass upon an application of a man in charge of the bond department of a large city bank, age twenty-one, who applied for a Twenty Payment Life policy. Both parents were living at age fifty-five; he had one brother and one sister, aged thirty and twenty-five respectively. One sister died at age of twenty-three of meningitis. The grandparents' ages at death were fifty-nine, seventy-five, seventy-two, and seventy-five. He was a total abstainer, his height was five feet nine inches and his weight 204 lbs. His chest and abdominal measurements were good. According to the report of the joint committee referred to by Dr. Rogers and Mr. Hunter, he would be placed in the group which shows a mortality of 131 per cent. Let us apply the numerical method. His basic rating for weight would be 120. Adding five points for height, he would have 125. Counting his family history as good, he would have a

credit of ten points, and assuming that he would have a credit on account of his occupation equal to that allowed a bank officer, he would have another credit of ten points. He would also have a credit of five points on account of plan. The total value of the risk would be 100. What credits should be disallowed?

Another case is that of a farmer, aged nineteen, five feet ten inches high, who is five per cent. overweight. Two brothers died from tuberculosis, otherwise the family history is fair. The numerical valuation is 100. Is it really an average risk? Disregarding the credit on account of occupation the value is 115.

If the numerical method is not of assistance in those cases which on their face are clearly acceptable or unacceptable, and if it cannot be used in doubtful cases, wherein is its value to a company which does not do a sub-standard business?

It is evident, as the authors concede in their concluding paragraphs, that the whole truth is not included in the numerical system as now practiced, and that the system is not theoretically correct at all points. The great trouble which I find with it, as I have tried to show, is that it does not appear to be usable where it is most needed. In the hands of one who did not clearly comprehend its limitations, the most disastrous results might follow its use.

The selection of risks has shared tremendously in the advancement of knowledge, and I, for one, am very ready to entertain the hope that in the near future some way of giving the numerical system a more universal applicability will be found.

Dr. Toulmin—As I read the paper of Dr. Rogers and Mr. Hunter, I recalled with what interest I first heard of the plan of numerical rating, as described rather sketchily by the former, some years ago. In its present complete form with an exhibit of the detailed workings, the examples of its practical application, the expounding of its general principles and the exposition of certain criticisms thus far made, I find it still more interesting and full of valuable suggestions to those who desire to improve their methods of selection.

My earlier doubts as to its being of true practical value to the great majority of companies, because of the lack of sufficient available data, is now largely removed. As the authors say, we have now "abundant material" from which to obtain the information necessary in making up tables of expected mortality. And to the authors we are more indebted than to any other writers, for this material.

Indirectly, the study, and still more the adoption of such a plan as is here outlined will be beneficial, in that it will tend to a closer and more careful consideration, not only of information already at hand, but will in addition be an inspiration to each individual company to ascertain its own experience and in future keep records which will be of the greatest possible value.

That everyone who is passing on applications for insurance consciously or unconsciously gives credits and debits to the favorable and unfavorable factors is, I believe, generally accepted. That we can get a more accurate value of the individual case by the numerical method as described, rather than by mental arithmetic,—one less influenced by the vagaries of the mind, one in which the personal peculiarities or characteristics of the selector play the least part, is I believe, likewise true. If a company is doing a sub-standard business it would seem such a method is absolutely necessary and in standard selection the results should certainly be more satisfactory and accurate.

I imagine the great majority of companies have not intrusted their selection to clerks, but it certainly is a safe and sane procedure within certain limits. If by so doing the expert medical director can concentrate his time on the more complex cases, and properly consider the larger problems constantly before him, and be relieved of the necessity for hard driving under pressure, it will be to his advantage. I am sure there are always enough such cases and problems to keep him from stagnating.

To a company doing a standard business only it does not matter how bad a bad case may be, or how good a good case

may be,—the one is declined, the other accepted, and it can be declined or accepted equally well by a trained clerk or the Medical Director; but the doubtful, or unusual, or borderline case needs all the acumen and wisdom and experience that can be brought to bear. And it is with this important though small group of cases that the greatest care should be given.

I notice that considerable prominence is given to the applicant's build,—in "passing judgment" upon a risk you are to "begin with the applicant's build." It is the basic rating in the examples given. I fear I have failed to grasp the necessity of giving such particular importance to this factor, and should like to have the point made clearer. And in this connection I wish to ask if there is not one factor in the question of build which has a bearing on the rating and which the paper fails to mention. I have always felt that if an overweight applicant can be shown to be the counterpart of a parent who is living or dead at an advanced age, other factors being similar, and the individual was of the type known as "elephantine," big boned, solid, not soft and flabby,—you had a much better risk than one of the opposite type, and in whom overweight was an individual peculiarity.

I am not surprised to find a warning that the method described must be used with judgment and common sense. Adding up a column of figures and stopping there is quite as open to criticism as accepting the report of the M.-A. Committee on its face, without a proper interpretation of the results.

Various tables found in the paper are of immense value and a great help to all who are interested in the question of the proper selection and rating of risks. Personally, I am deeply grateful to Dr. Rogers and Mr. Hunter for this splendid piece of work. We have already taken the first step in the method advocated. I am far more desirous than ever before to adopt it as a routine measure, and give it a thorough trial. For I am convinced that "in practical use" it will indeed be "a powerful aid in the selection of risks for insurance."

Mr. Hutcheson—We are very much indebted to the authors for this paper. We have listened to a discussion by some who

have had experience with such a system, and I suppose I was asked to discuss it because I had had no such experience.

✓ The authors are correct, I think, in stating that every risk for life insurance is considered by taking into consideration the nine factors mentioned in their paper. Before reading this paper, I had assumed that a certain number of points was given for each factor—as our friend Dr. Knight might have told us is the case in judging hogs, and for that matter in the score cards used in judging the products of farm, garden, and orchard—but it would appear that the system described in the paper gives 100% for average build, the first factor, with additions for unfavorable and deductions for favorable points either in that or other factors, although the statement in the 5th paragraph of the paper, viz.: that “A process of additions and subtractions . . . according as each factor is favorable or unfavorable . . .” would lead one to suppose that the reverse was the case.

It is a numerical system and yet we are told and can well believe that the valuation of certain cases “must always be tempered by the judgment of the medical expert.” It is *not* a scientific system the authors tell us, for they state in the first paragraph of their paper that “the numerical system, *or some other built up along scientific lines*, will replace generally the old empirical method of selection. If it is not a straight numerical system nor a scientific system, what kind of a system is it then? One which works well in practice they tell us.

In describing its advantages they tell us:

- (1) “That it results in a more uniform treatment of risks because the judgment of the individual medical selector is steadied and restrained by the use of standards,” and further;
- (2) “That the liability to error is greatly reduced by the detailed analysis to which each risk is subjected,” and;
- (3) “That the work of the medical expert is much lessened because so much of it may safely be entrusted to clerks.”

I don't know whether the system of numerical rating is applicable to the case of the joint authors of a paper, but I should judge from these quotations that a member of the Association

of Life Insurance Medical Directors was responsible for 95% of these quoted remarks and that the Actuarial Society was represented by the remaining 5%. Perhaps this is a case, however, with a rating of 200%, or, on the other hand, it may be one where "the allowance of credits for favorable factors must be practiced with certain reservations." All I ask of the authors, however, is that my "physical condition" be not subjected to "two or more attacks" from the authors at one and the same time.

But joking apart. We all appreciate the difficulty of judging borderline cases in a uniform manner, and if such a system as this tends towards uniformity of action it certainly has one great merit.

Dr. Symonds has described a method pursued by our Company in employing trained clerks, or "lay checkers" as we call them, to pass upon applications up to \$10,000, where beyond certain prescribed limits, there are no adverse circumstances either on record or in the application papers.

These "lay checkers" are instructed as to what are and what are not adverse circumstances, so that *there is uniformity* in their treatment of risks—one of the advantages of the numerical system also.

As over 50% of the applications received each day are acted upon favorably by these "lay checkers" without reference to the Medical Department, the work of the medical selector is much lessened, and the fact that policies for no less than 80% of the applications received at the Home Office each day are sent to our managers that afternoon, shows that under our system we handle large amounts of business at great speed.

No separate mortality investigation of applications acted on by the "lay checkers" has so far been made, but, as an indication, it may be stated that our first policy year's mortality has not deteriorated since the system of lay checking was inaugurated a few years ago.

It should be remembered that we do no sub-standard business. This brings me to the question of *standards of expected mortality*. Each company must of course determine its own

standard according, inter alia, *to the dividend scale which it wishes to pay*, or, to put it another way, according to the surplus it wishes to make from mortality more favorable than that provided for in the tables used in the calculation of its premiums and reserves.

Our Company, since 1906, has set a standard of first year's mortality, by amounts insured, of not more than 40% of that provided for by the American Table, and until the influenza hit us last year, our average first policy year mortality was under 35% of the American Expected. Expressing it in terms of the new Mortality Table, our first year mortality averaged 84% of the American Men Select Table. This 84% was not only the average for the first policy year, but also for the first five policy years and for the first nine policy years—all by the American Men Select Table. For business issued prior to 1907, the mortality averaged 116% for the first policy year, 116% for the first five policy years and 108% for the first nine policy years—all by the American Men Select Table.

I have stated these facts as to our mortality experience for two reasons; first, to show incidentally that there was a great improvement in mortality in the experience of one company during the period covered by the investigation which resulted in the new American Men Table, and, second, so as to elicit information from the authors as to whether or not I am correct in my interpretation of the connection between a company's mortality standard and its numerical rating standard.

Suppose a company were to adopt 84% of the American Men Select Table as its standard for selecting risks. If it did so, then it would aim at selecting risks so that its mortality, first year as well as subsequent, should on the average equal 84% of that standard. Classes of risks which would yield an average of this 84% should then, I presume, be considered 100% numerical rating for the mortality standard chosen? We would of course have some 85 per cents. and some 115 per cents. to balance them.

Another question. What Mortality Table (standard or

otherwise) does the 100% (average) numerical rating of the New York Life represent?

If it is desired to adopt a more stringent mortality table as a standard (84% instead of 100% of American Men, *e.g.*) would this be done by simply reducing the maximum, supposing it to be 125% just now, or would the whole system of points be rearranged?

I am assuming of course that the rating system has been found satisfactory from a *mortality point of view*. The statement appears that those companies which have used this system are "satisfied" with it, but whether because it removes friction by reason of uniformity of treatment or because the mortality results are good, or for some other reason we are led to conjecture.

Would it be too much to ask the companies which have tried the numerical system to tell us what rates of mortality (Compound Progressive, Select and Ultimate American, or what) they "expect" from their standard business and how their "actual" mortality on standard business so selected has compared with their "expected." This, from my point of view, is the real test as to the efficiency or otherwise of the system. Unless the system gives good mortality results, it must be weighed and found wanting. The New York Life has taken 125% as a maximum for standard business and a statement of their mortality results on business up to this maximum, translated into percentages of some standard mortality table, would be "the proof of the pudding," to use the authors' quoted adage.

I have no doubt Mr. Hunter will, on some future occasion, satisfy my curiosity, and, for good measure, will add the results on their substandard business.

Reference is made in several places to vol. ii. of the Report of the American-Canadian Mortality Investigation, which has not yet been published, so far as I know. Mention is made of this Report in connection with "Credits and Debits for Plan for Insurance" and 15 points addition is suggested for term insurance and certain points are suggested as deductions

in the case of limited payment life and endowment insurances, but it must be noted that these modifications in rating are suggested only in certain borderline cases. The effect of the addition for term insurance will be to bring certain cases above the maximum and the result of the deduction in the case of limited payment and endowment insurances will be to bring some cases under the maximum limit. In view of the known selection against the companies in the case of term insurance applications, no fault can be found with this addition from the practical point of view. The granting of standard insurance on the limited payment and endowment plans, where the deduction brings them below the maximum, will of course bring up the average mortality in these groups, but, as the mortality in these groups is below the normal, no exception can be taken to some deductions being made, such as those suggested.

Like the previous speakers, I would like to add my thanks to the authors for having given us this excellent paper, which like all of the papers presented by them, jointly and severally, give us not only food for thought and reflection, but help in our daily tasks.

Bacon tells us that he holds "every man a debtor to his profession, from the which as men of course do seek to receive countenance and profit, so ought they of duty to endeavor themselves by way of amends to be a help and ornament thereto."

The authors are a help and an ornament to their professions, and as they are indebted to their professions so are we indebted to them.

Mr. F. B. Mead—The paper on numerical ratings is highly acceptable to the great majority of companies, not only to those that have already adopted the system more or less extensively, but also to those who have been contemplating its adoption, besides the present most complete and thorough treatment of the subject will do much toward convincing those who have up until now more or less vehemently been opposed to the system.

The objections which have been advanced against the sys-

tem seem to have been so effectively dealt with that it seems that little could be added on that score. Referring, however, to objection (b) as to factors being interrelated so that the true valuation may not fairly be expressed by the numerical process, for instance a mitral regurgitant murmur in combination with a recent attack of rheumatism, the authors say that they recognize the force of this objection, but that even in such cases the medical expert is greatly assisted by the numerical system. It seems to me that this objection may effectively be answered by the statement that this principle may be provided for by extension of the numerical system.

Not only should a company have a table of ratings for independent heart murmurs and history of rheumatism, but the heart murmur tables might very well be extended by providing for ratings for heart murmurs associated with a history of acute articular rheumatism.

✓ In this connection I should like to ask whether the authors consider albuminuria associated with high blood pressure as additive factors or whether it is not true that a combination of these two impairments requires an almost prohibitive rating? In other words, whether the combination is not practically uninsurable, particularly if the diastolic is high.

It is quite probable that the natural development of the numerical system will show a tendency to have more ratings in combination, particularly for related impairments which are not additive.

The authors call attention to an interesting arrangement of a basic build rating table devised by one of the other large companies using this system. It seems to me that in order to arrange a table of the type used by this other large company it is unnecessary to consider the rearrangement as regards the *best weight*, that is the build which will give the best mortality for a given age. Such a table may be arranged by taking the standard weight for average height, 5 feet 8 inches, for a central age group, such as 33 to 37, or 35 to 39, which weight is 157 pounds for the latter group, and considering 157 pounds as the central weight for 5 feet 8 inches for all other age groups, and

then rearranging the mortality percentages for the various age groups according to the departure in pounds percentage or pounds absolute from that central weight. A table arranged in this manner obviates at once the computation of percentages under or over weight or pounds under or over weight. In using the table one merely enters the table for the weight and height of the applicant as one would with a table of logarithms and then follows down the column to the age group of the applicant from which is obtained the mortality percentage by mere inspection. We have used such a table in our Company for some considerable time and have found it simple and easy of application and a great time saver.

The authors call attention to the fact that the New York Life build table indicates a lower mortality for overweights than that of the Joint Committee. For instance, for the central age 35, for the average weight of 5 feet 8 inches, the New York Life table indicates for 40% overweight a mortality of 155% as compared with about 170% according to that of the Joint Committee. It is not clear from the explanation given by the authors as to just why this departure, for they merely refer to an adjustment in the case of tall overweights whom they believed to have been liberally selected by the companies embracing the experience, owing to a predisposition to look through glasses *colour de rose* in the case of tall "well-built" specimens of manhood. It would be interesting to have an explanation from the authors as to why an adjustment was made in connection with men of medium height, especially in view of the committee report in volume ii. of the Medico-Actuarial Investigation that the companies in general had selected risks of this type very carefully.

It must also be borne in mind that the mortality percentages of the Joint Committee were derived from the experience of insured risks who were selected as standard and, therefore, it seems that the Joint Committee's build table should be loaded for selection for use by a Company rating up applicants on account of build. At any rate it seems to the writer that there should be in some manner incorporated some percentage

for selection. It would seem to me, however, that the more rational plan for loading for selection would be that the percentage be added after the risk has been determined to be sub-standard according to the numerical system. Naturally if it were determined to be standard there would be no necessity for loading for selection but this would be the case if the loading for selection were incorporated in the original build table.

Mr. Welch in his paper on Practical Rating for Overweights (*T. A. S. A.*, volume xvii., page 17) calls attention to the fact that in spite of the warning given in the text of the report of the Medico-Actuarial Investigation against accepting the final percentages of actual to expected deaths in the various classes as evidencing the mortality which might be expected in the future in any completed experience, tables had been formed for use in underwriting from these very percentages. Referring to the New York Life mortality percentage of 155% for 40% overweight at age 35, I would call attention to the fact that the corresponding percentage according to the original Medico-Actuarial report would be approximately the same. It is also for this reason that it will be interesting to have from the authors of the paper their reason for reducing the mortality percentages for overweights as shown in the special report of the Joint Committee.

According to our own experience in connection with the use of a similar table against which we have been giving similar credits for family history, favorable abdominal measurement, and the like, the cases which receive credits predominate over those which receive charges, with the result that our average rating for a particular build class is much less than that shown by the average experience for the build according to the experience of the companies entering into the Medico-Actuarial Investigation. I should like to ask the question whether the New York Life has had a similar experience in connection with their overweight applicants.

The authors call attention to the fact that in case a family history shows one death below 60 from cancer, diabetes, apoplexy, etc., the family history is considered average; if

there is no such death it is considered exceptional and a credit given of 15 points; if there are two such deaths the family history is regarded as poor and a debit given of 30%. It will be noted that these are all degenerative diseases and the question occurs as to why such a debit or credit be considered in connection with young lives applying, for instance, for short term endowments under which they will never reach the period of life involving degenerative diseases?

Under the heading, "Restriction of Credits," the authors call attention to the fact that where there is an impairment like albuminuria the practice is not to grant standard insurance, although the credits for other favorable features might bring the risk within the standard limit. For instance, from a physical standpoint +100% might be applied to an applicant showing albumin and casts upon examination against which he might have a credit, say of 15% for occupation, 15% for favorable family history, 5% credit for build, and 10% credit for plan, making a total credit of 45%, bringing the rating down to 155%. It would be interesting to know whether in the practice of the Company this maximum credit would be given on a case of this type and, if so, how this practice could be reconciled with a case having albuminuria but no casts for which the percentage rating might be +35% and which would be entitled to these same credits but would receive practically none, owing to the principle that an applicant with an impairment of this sort would not be granted standard insurance. An applicant of this type would be rated for his physical impairment without receiving the benefit of the credits which he would receive had he had a more serious impairment. According to this theory a man with a slight impairment is not as likely to be improved by other favorable features as a man with a more serious impairment, whereas would not the actual facts be quite the contrary? Again it might be possible under similar circumstances that two applicants be rated alike although one would have a physical impairment 40% worse than the other; they might both have favorable features for which the credits are 40%, but one of them would not receive any

credit as his physical impairment would be rated, say +30%.

The authors have been so generous from their abundant fund of information on this subject that it seems almost like looking a gift horse in the mouth to raise further questions, so complete is our gratitude for what they have given us. However, since this is a paper presented before a scientific society it is presumed that a certain license may be assumed as to raising certain questions on some of the points brought out by the authors, whose indulgence is sought as to their attention to some of them that have been troubling the writer both in practice and in connection with the reading of the paper.

Mr. Sheppard—I should like to suggest that perhaps a defect in the system arises from the mathematical axiom that the probability of an event happening which can be the result of two separate causes is the product of the probabilities pertaining to each cause only when those two causes are mutually exclusive. The writers recognize that, when they say in their paper—"The rating for a bartender who is known to use alcohol freely or from time to time to excess is not the algebraic summation of the two factors of occupation and habits, for the reason that the high mortality incident to the occupation of bartender is in part due to the fact that substantially all bartenders use alcohol freely." As the different classes are not mutually exclusive it follows that you should not apply strictly the summation of the ratings. For instance, personal history and family record or habits and occupation cannot always be considered as mutually exclusive. I throw this out as a suggestion why a strictly mathematical addition and subtraction should not be followed in every case.

Mr. Coburn—In these remarks I shall consider the treatment of only sub-standard business under a numerical system of rating. Arthur Hunter and Dr. Oscar H. Rogers stated (*T. A. S. A.* xvii., 289): "Any group of lives, homogeneous in so far as the fundamental factors are concerned, includes individuals which are better risks than the average of the group, as well as those that are not so desirable as the average." For

example, a sample of risks numerically rated 170 will include some that should be rated 150 and others at 190. This observation of these authorities is undoubtedly correct. Conversely a sample of risks that should be rated 170 will include some that are numerically rated 150, and others that are numerically rated 190. The numerical system tends to "scatter" the ratings, that is to flatten the curve of distribution.

This tendency to "scatter" the ratings makes it more difficult to classify sub-standard risks than to classify standard risks. I believe much of the difficulty of classifying sub-standard risks can be eliminated by adopting different sub-standard classes. A classification somewhat as follows may be adopted:

<i>Sub-standard Classes</i>	<i>Average Mortality as Percentage of Company's Standard</i>
A	125%
B	150%
C	175%
D	200%

The sub-standard class C would include risks accepted on the basis of 165, 170, 175, 180 or 185% of the particular company's own mortality. It is much easier to divide the applicants into classes than to divide according as the applicants are considered 145 risks, 150 risks, 155 risks and so on. The latter method attempts too great a refinement.

As an illustration of the application of this scheme take Example 4 in the authors' paper. This bank officer is rated 145 and would on the basis of that rating go into Class B. With the papers before him, and after a study of the case, the person making the classification might well prefer to accept this risk in Class C.

In considering the classification of sub-standard business there is a danger that we may give too much attention to the amount of the extra mortality and too little to its incidence. Joseph Burn in his paper before the Fifth International Congress of Actuaries and Henry Moir in his paper before the Tenth American Life Convention have observed that many

sub-standard groups tend to exhibit normal mortality after the lapse of a period of years. After an examination of a considerable number of groups of lives sub-standard on account of occupation or medical impairment, I came to the conclusion that in the majority of classes the curve of sub-standard mortality approaches or merges with the standard curve after the lapse of an average period of twenty years. It follows that in general the reserves for sub-standard business should be less than for standard business (I am not discussing climatic cases here).

It has been quite common to accept sub-standard risks with an advance in age and with cash values greater than the normal. In my judgment it would be better to charge extra premiums not subject to commissions and not participating and with standard cash values. Even though the extras are not participating the insured has the option of applying his standard dividends to buy additions at standard rates. It will be found that for a mutual company the ordinary life extras on this basis are not more than 50% of those usually charged under the advance in age system. The use of extra premiums without advance in age will reduce the proportion of undelivered sub-standard policies. This is an important consideration.

The authors recommend a credit of 10 points for 20 year endowments. In accepting a substandard risk of a type producing a substandard mortality curve that finally approaches the standard curve, and with commission scales such as are commonly now in use, I question the general advisability of this credit in handling substandard business. I believe preference has often been given to the twenty year endowment plan where the companies would have been better advised to accept on a life plan. The offer of a life plan should reduce the undelivered sub-standard business.

I have previously referred to the tendency of the numerical system to scatter the ratings. This is not a serious objection when the system is handled by experts. It should never be used except under the immediate control of experts. If applied by those who overlook its limitations the results will be merely

mechanical. The best risks of a type will receive the same treatment as the poorest. This will result in the non-delivery of policies in too many cases better than the average.

I believe that the numerical system is a valuable aid in the selection of sub-standard business. With the numerical rating before you it is really much easier to arrive at a proper classification of a risk. While the numerical rating need never be considered final, it is almost always a valuable guide.

The Society is indebted to the authors and to the New York Life Insurance Company for this generous contribution to the profession. They can be of still greater service by adding additional classes to the lists of typical ratings shown in the paper.

Mr. Moir—If there are no other speakers on this subject, I will call on the authors to make a few remarks. I have one question to ask. I notice that credits are given for plan, and before Mr. Hunter speaks, I would like to ask how they view the question of credit for plan. I understand a debit for plan, but I know that many of our agents realize that they can get a case through on one form when it would be dubious on another, and therefore the case comes to us originally on an Endowment plan, and in that event I would hesitate greatly about giving them a credit for it.

Dr. Rogers and Mr. Hunter—We have been very much gratified with the interest manifested in our paper and with the kindly spirit shown in the criticisms of it by our friends even though they disagree with us. The paper and the discussions should enable actuaries and medical directors to determine their attitude towards this method, and it does not seem necessary therefore to take up further any controversial points. Before answering questions or doubts which have been raised, we should like to state that we are particularly gratified to have Mr. Henderson say that after three years' trial of the method of numerical ratings he is not disposed to "abandon it until something better is presented to take its place." That represents our feeling—we are unwilling to abandon it in our present state of knowledge but will do so as soon as a better plan is offered.

We can hardly agree with Mr. Rhodes or Mr. Macaulay that a numerical method should be judged by applying it to extreme cases, nor do we admit that it is an empirical method. If science is organized knowledge, then we may reasonably claim that our method is a scientific one.

Dr. Symonds gave good reasons for the claim that we have not been allowing as broad a spread of values in the matter of family history as would be justified, but we are not disposed to make a change until a larger amount of material is obtainable. With regard to Dr. Symonds's comment on the employment of clerks, we should like to mention that 65% of our business is handled automatically against 53% by the Mutual Life, but our percentage would be much larger, probably 80%, if we were not doing a sub-standard business.

The answer to Mr. Moir's question is that we expect to occasionally grant a short term endowment policy without advance in age by reason of the credits for plan of insurance when an ordinary life policy would be charged an advance in age. We question, however, whether this would have any practical importance in inducing agents to canvas for endowment insurance.

Another question brought out in the discussions is, Would it pay a company which does only a standard business to adopt the numerical method? We recognize that the numerical system is not nearly of so much interest to a Company which does standard business only, but it would be of very great value in all doubtful and borderline cases, by reason of its steadying effect upon the judgment of the selector. Indeed we feel that we have not emphasized sufficiently the flexibility of the method in assisting the judgment of the value of a risk. An illustration will show this. If our experience showed that in a large number of cases of mitral regurgitation the average mortality was 175% the judgment of the medical officer is steadied and fortified by this knowledge, but it does not necessarily follow that he should rate every case +75 for mitral regurgitation. He may decide that the occupation, the mode of life, or other factors make the risk better than the average, and that +60

will be sufficient to cover the hazard; on the other hand, he might consider that an occupation involving long hours of physical strain would make a risk worse than the average, and that it should be rated +100 or even +125 for mitral regurgitation.

There is another question implied in the discussions, namely, what interest have we in bringing this subject again to the attention of our professional brothers? Our only interest is to focus attention on the subject of medical selection in the hope that better methods will be obtained. We freely acknowledge the defects of our method and are anxious that other minds should help us to find a solution to them or to develop something better.

If we can find time to prepare it and if the Actuarial Society or the Association of Life Insurance Medical Directors be disposed to accept it, we shall be glad to submit a paper on the relative mortalities incident to various occupations; but we have with the present paper and other contributions inflicted you so often that we promise, so far as the question of numerical ratings is concerned, never to offend again. Any further contributions we shall make may be applied to the system we have here recommended or to any other scientific system of selecting risks for insurance.

Mr. Moir—It has occurred to me, and also to others, that much of the written discussion to-day, and the other discussion also, is of permanent value, and I think the question should be decided here, whether this discussion should be edited and published. I should like an expression of opinion on this subject.

Mr. Welch—Mr. Chairman, I think we should all be loath to lose what we have listened to here this morning, and to be deprived of the opportunity to read it carefully and digest it. If those who have taken part will consent to it, I think the discussion should be made a part of the *Transactions*. I can of course only speak with regard to the Actuarial Society, but on the part of that Society I should like to make the motion that the joint papers and discussions that are given here to-day be made a part of the *Transactions* of that Society.

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Dr. Rogers—Mr. President: It gives me great pleasure on behalf of the Association of Life Insurance Medical Directors to second the motion made by Mr. Welch, so far as the *Proceedings* of that Association are concerned.

The motion was carried.

HEART MURMURS—THEIR INFLUENCE ON LONGEVITY

BY DR. OSCAR H. ROGERS AND ARTHUR HUNTER

This is a study of the mortality experience of the New York Life Insurance Company in certain male risks looked upon as sub-standard by reason of heart murmurs. It includes only risks with single heart murmurs and without other impairments excepting a few referred to later in this paper. These risks were insured during the years 1896 to 1917, both inclusive, observed to their anniversaries in 1918. They were insured in various ways. During the earlier years they were granted policies with liens varying in amount according to the seriousness of the impairment, and at the same time were placed in a special class as to dividends. In 1904, another class was formed in which the less seriously impaired risks were insured without liens but in a special dividend class. At the end of 1906, both of these classes were closed, and thereafter, upon new risks assumed, the extra mortality expected to occur was provided for by advances in age or by extra premiums. The selection practiced against the company may therefore have varied by reason of the different methods employed to meet the additional mortality expected among these sub-standard lives. There is no doubt also that the selection exercised by the company itself varied to some extent over these years because of a progressively broadening experience with the insuring of under-average risks. Then, too, the gradual extension to other companies of the practice of insuring sub-standard lives may have caused some anti-

selection through the fact that these risks were in a position to exercise a certain choice as between companies.

It may be proper at this point to say that the company has throughout been guided in its selection solely by its own experience, and not by the position taken by other companies doing business in the same field.

In making application of that experience, the fundamental assumption that the insurance value of any risk is the summation of the insurance values of its component factors has been followed. For the greater part, the risks were normal, average risks in every other respect than the presence of a heart murmur, and in those which presented any other impairment than the heart murmur the hazard was assumed to be increased to the extent of the numerical value of that impairment. In the case, however, of intermittent or irregular pulse, by reason of its correlation to the heart murmur the impairment was looked upon as an expression of damage to the integrity of the heart, and only those were accepted in which the irregularity or the intermittence was but slight. On the whole, the selection was a careful one.

Making due allowance for these various influences, the results brought out by this study are probably a fair indication of what may be expected to occur among similar risks hereafter. Looked at from this point of view, we are hopeful that they may prove of real value not only in the insurance business but in scientific medicine as well.

By way of clarifying the subject to laymen it may be well to give at this point a brief outline of the structure and function of the heart.

The heart, which carries on the circulation of blood in the body, is a four-chambered pump, two auricles and two ventricles, and is divided by a muscular partition into a right heart and a left heart, each composed of an auricle and a ventricle. The right auricle and ventricle receive the blood from the body and distribute it through the lungs. The left auricle and ventricle receive the blood from the lungs and distribute it throughout the body by way of the aorta and the great ar-

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teries. The blood received in the auricles is impelled by the contraction of their muscular walls through valvular openings into the ventricles. The ventricles in their turn contract, the valves through which the blood is received close, and the blood is forced forward through the other valvular openings which in turn close. The rhythmical contractions of first the auricles and then the ventricles constitute the heartbeat, and maintain the steady flow of blood throughout the lungs and the body. When the various valves of the heart are in a normal condition, they open freely to the passage of blood in one direction, and close completely so as to prevent any flow of blood in the opposite direction. The sounds of the closure of the valves, heard on the front of the chest over the cardiac area, serve as an indication of their condition.

In life insurance work we see very few cases of disease of the valves of the right side of the heart, those connected with the right auricle and the right ventricle, but those on the left side are frequently crippled, and are of great interest in the life insurance business, as well as to the medical profession generally.

If the valve between the auricle and the ventricle on the left side of the heart, the mitral valve, is diseased in such fashion as to prevent the normal flow of blood from the auricle into the ventricle, the disease is spoken of as "mitral obstruction," is very serious, and risks representing it are rarely accepted. If it is damaged so as to permit a leakage of blood back from the ventricle to the auricle, the lesion is known as "mitral regurgitation." This is the commonest form of valvular lesion. If the valve between the left ventricle and the aorta, the main artery of distribution through the body, is diseased so as to obstruct the flow of blood from the ventricle into the aorta, the lesion is known as "aortic obstruction." A leakage of blood back from the aorta into the ventricle constitutes an "aortic regurgitation." This is the most serious form of heart disease and very few risks of this kind have ever been insured.

Clinically, the condition of the heart is determined by

examining the character of the heart sounds over the front of the chest in the cardiac area. The sounds which are of special interest are the booming sound of the closure of the mitral valve, and the sharp, clicking sound of the closure of the aortic. If a murmur replaces either of these sounds, the presumption is that the valve over which it is heard is in some way impaired so as to cause an obstruction to the forward movement of the blood or to permit a leakage of it backward in the direction from whence it came. The murmurs caused by disease of the mitral valve are heard best near the apex of the heart. If the murmur takes place during the contraction of the ventricle, it indicates a leakage of blood back from the ventricle through the mitral valve into the auricle. This murmur is transmitted to the left and heard behind at the lower angle of the shoulder blade. If the murmur takes place after the contraction of the ventricle, it is not transmitted to the left, and indicates an obstruction in the flow of blood through the mitral valve. Murmurs produced at the aortic valve are heard best near the base of the heart. If they are due to an obstruction they occur with the systole or contraction of the ventricle and are transmitted upwards towards or into the great vessels of the neck. If they occur when the ventricle is at rest, and the sound is transmitted downwards along the sternum or breast-bone, they are due to a slipping back of the blood through the aortic valve from the aorta into the ventricle.

It has long been recognized that besides these clearly organic murmurs, there are others less clearly defined which are spoken of as functional, that is to say, as due not to changes in the heart valves, but in some manner to changes in the condition of the blood, to the effect of the movement of the heart upon adjacent parts of the body, to unimportant abnormalities in the structure of the heart, or to other similar causes. The influence of these functional murmurs upon longevity is little known, and one of the objects of this study is to attempt to throw at least some light upon the subject.

For life insurance purposes it is necessary to know whether there is or is not a heart murmur present, and if present, the

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nature of it, the degree of enlargement, if any, of the heart, the rate and character of the pulse, and the blood pressure both before and after exercise, and, having through these facts determined the nature of each case, to know what mortality is to be expected in a group made up of exactly similar lives compared with an equal-sized group of normal lives. To bring out in each case as many of the necessary details as possible, the company has for many years made use of a special heart blank, upon which the medical examiner is required to describe graphically upon a skeletal outline of the chest the details of his findings, and to state in writing the conclusions he has arrived at as the result of his examination. This heart blank was at first a very simple affair, but has been added to from time to time in accordance with our greater experience, until at the present time we are asking for a very detailed report, as may be seen from the copy of our latest heart blank appended to this paper. Incidentally, it may be said that the use of this blank has had the effect of putting the examiner on his mettle to do his best, and at the same time has enabled the company to make a fairly accurate estimate of the value of his work.

This study is based upon an analysis of these special reports, taken in connection with the routine records of the medical examinations. Although the risks were accepted from all parts of the country, as examined by the local medical examiners, a considerable majority of them were examined in the populous centres where they were studied by physicians better fitted than the average to give a trustworthy opinion of the character of the lesion. On the whole these various murmurs were more accurately diagnosed than if studied by the average practitioner. It is true that the value of the results to scientific medicine might have been much greater if each case included in this study had been passed upon by a heart specialist and its exact character determined with all the technical skill and apparatus at his command; but its value to the medical profession generally and to life insurance would not have been so great, because not all physicians may hope to

attain the technical skill of specialists, nor may life insurance companies hope to avail themselves of that kind of talent. On the other hand, it may be claimed that these cases have been kept under observation for much longer periods than is possible to the specialist, and are correspondingly more dependable. Probably the advantages on the one side offset those on the other, and we may claim that until the specialist keeps all of his cases under observation over considerable periods of time, and compares the mortality among each of the groups of them with that in groups of the same size and age distribution made up of standard lives, his testimony as to the probable mortality to be expected in this or that heart lesion is entitled to no greater consideration than is that brought out by life insurance statistics.

For the benefit of those who are unfamiliar with the subject from the life insurance point of view, it may at this point be said that in order to determine whether the death rate in any group of lives suspected to be impaired has been greater or less than the normal, it is only necessary to compare the *actual* deaths in that group with the deaths which would have occurred in an exactly similar group of normal lives, in other words, the *expected* deaths. The death rate among normal lives has frequently been the subject of investigation, and in the life insurance business, tables of mortality are used, which express the death rate to be expected at the various ages according to the number of years each life has been under observation. Sometimes these tables have been prepared according to *amounts* insured, sometimes according to the number of *policies*, and again according to the number of *lives* included in the investigation. As the present study is based upon the mortality according to the number of *policies*, we have made use of the experience of forty-three American and Canadian companies, published a few years ago, under the title "The Medico-Actuarial Mortality Investigation." This M.-A. Table, as it is called, gives the death rate by *policies* among normal lives at various ages, and according to the number of years elapsed since the medical examination. If, for example,

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150 *actual* deaths occurred in any given group, and if according to the table employed there would have been *expected* 100 deaths in a group of normal lives of exactly the same number and age distribution, kept under observation for exactly the same length of time, the relative mortality would be 150 per cent., or 50 per cent. in excess of the normal. All of the mortality ratios in this study express this relation of actual to expected deaths in terms of the M.-A. Table.

It is generally expected that in a group of under-average lives the relative mortality by *amounts insured* will be greater than by *lives* or by *policies*, unless very great care has been taken in the process of selection to limit the amount at risk on any single life. It may be of interest in this connection to say that while this study has been based upon *policies* instead of upon *amounts*, two of the largest groups have been studied by amounts to test whether there has been any considerable difference. The results of that study show that the mortality ratios were substantially the same, indicating that, by a careful limitation of the amount insured on each life, in these sub-standard risks the anti-selection usually incident to amounts has been excluded.

A fact which should be mentioned is, that the experience of the New York Life Insurance Company during the earlier years of the period covered by this investigation corresponded very closely with the Compound Progressive Mortality Table, the table representing the company's experience from 1872 to 1902, while, during the later years, it corresponded more closely with the M.-A. Table. The material, therefore, is drawn from three different periods of mortality experience, a Compound Progressive period, a period of transition, and an M.-A. period. No single table in existence would serve to measure the relative mortality between these sub-standard lives and normal lives insured by the company over the entire period covered in this study. Taken altogether, the Compound Progressive Mortality Table is not sufficiently rigid, and the M.-A. Table is a somewhat too rigid standard. To express the ratio of actual to expected deaths in this paper,

according to the experience of the company in normal risks, a mean between the ratios of the C. P. and of the M.-A. Tables would probably serve as a reasonable approximation. To this end, the expected deaths by the C. P. Table have been determined in two of the largest groups, and the relative mortality according to that table can be approximately obtained for other groups by reference to the corresponding ratio by the M.-A. Table.

This experience covers a part of the period of the influenza epidemic, but only policies with anniversaries in the last three months of 1918 were affected. If all of the data had been kept under observation until the first of January, 1919, the relative mortality would have been increased by 3 per cent., from which it will be seen that the epidemic has had but little effect on the results now submitted.

MITRAL REGURGITATION

The latest group in this investigation is that of risks with mitral regurgitant heart murmurs. The group was subdivided into mitral regurgitation without hypertrophy of the heart, 7,025 in number, and mitral regurgitation with hypertrophy, 1,282 in number. We have also studied the former group according to the build of the individuals composing it. We have, besides, studied a group of persons with mitral regurgitation who presented a history of inflammatory rheumatism, another group with a history of dyspepsia or gastric catarrh, and still another in which the pulse was irregular. All of these groups present no other impairments excepting those indicated by their respective titles.

MITRAL REGURGITATION WITHOUT HYPERTROPHY (No other impairment.)

<i>Ages at Issue</i>	<i>Actual Deaths</i>	<i>Expected Deaths by M.-A. Table</i>	<i>Ratio of Actual to Expected Deaths</i>
15-29.....	135	79.0	171%
30-39.....	148	73.5	201
40 and over.....	121	71.3	170
All ages.....	404	223.8	181%

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On the basis of the Compound Progressive Table, the expected deaths would have been 267, and the ratio 151 per cent. Assuming that the probable mortality ratio falls midway between that determined by the C. P. Table, and that obtained by using the M.-A. Table, we shall not be far from the truth if we accept the mortality ratio, 165 per cent., as expressing the experience of the company with mitral regurgitation without hypertrophy, compared with its experience with standard risks insured during the same period of years.

An analysis of this experience according to policy years showed that during the first five years of insurance, the relative mortality was 184 per cent.; during the second five years 177 per cent.; and thereafter, 178 per cent., as measured by the M.-A. Table.

Of the 404 deaths, 149, or 37 per cent., were due to organic diseases of the heart. In a corresponding group of standard risks the number of deaths from organic disease of the heart would have been about 15, so that the death rate from heart disease was about ten times the normal. None of the other causes of death were sufficiently abnormal to call for mention, with the exception of Bright's disease and pneumonia, each of which showed about double the normal death rate.

The Influence of Build.—With a view to determining whether the mortality among persons with *mitral regurgitation without hypertrophy* is affected by build, the data were divided into three groups, according to build, as follows: Underweight, 10 per cent. and more underweight; average weight, 9 per cent. underweight to 9 per cent. overweight; overweight, 10 per cent. overweight to 24 per cent. overweight. There were a few cases showing a higher degree of overweight than 24 per cent., and these were at the young ages of entry. The results were as follows:

MITRAL REGURGITATION WITHOUT HYPERTROPHY

Mortality Experience According to Build

	<i>Actual Deaths</i>	<i>Expected Deaths by M.-A. Table</i>	<i>Ratio of Actual to Expected Deaths</i>
Underweight.....	122	73.6	166%
Average weight.....	244	129.6	188
Overweight.....	37	17.7	209

From these ratios it is evident that the relative mortality of persons with mitral regurgitation probably varies with the weight, although the amount of material available is hardly sufficient to justify a very positive statement on this subject.

The proportion of deaths from heart disease to the total deaths was, in the underweight group, 36 per cent., in the average weight group, 36 per cent., and in the overweight group, 46 per cent.

Very few cases were accepted in which the insured, besides overweight, had an abdominal girth greater than the chest expanded. Irrespective of their degree of overweight, the mortality among these risks with pendulous abdomen was very high, about three times that of the M.-A. Table.

MITRAL REGURGITATION WITH HYPERTROPHY

The 1282 policies included in this group of impaired lives were reported to have mitral regurgitation with well-marked hypertrophy. There were no other impairments.

MITRAL REGURGITATION WITH HYPERTROPHY

<i>Ages at Entry</i>	<i>Actual Deaths</i>	<i>Expected Deaths</i>	<i>Ratio of Actual to Expected Deaths</i>
15-29.....	41	19.5	211%
30-39.....	37	14.5	255
40 and over.....	28	13.1	214
Total.....	106	47.1	225%

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As the mortality in the corresponding group without hypertrophy was 181 per cent., it is evident that hypertrophy adds considerably to the hazard of persons with mitral regurgitation.

Dividing the experience by years of insurance, the ratio for the first five years is 238 per cent.; 254 per cent. for the next five years; and 174 per cent. thereafter. The amount of material in this group is not sufficient to warrant very positive conclusions as to whether the relative mortality increases, remains constant, or decreases with the duration of the policy.

About 40 per cent. of the deaths were due to organic disease of the heart, as compared with 37 per cent. for the corresponding cases without hypertrophy. The death rate from heart disease is about fourteen times the rate which occurs among standard risks.

If the Compound Progressive Table had been used, the expected deaths in the group with hypertrophy would have been 56.9, a ratio of actual to expected of 186 per cent., against 225 per cent. by the M.-A. Table, and a mean ratio of 205 per cent.

MITRAL REGURGITATION WITH INFLAMMATORY RHEUMATISM

There is a popular impression that heart disease associated with a history of inflammatory rheumatism is a more serious matter than heart disease without such a history. Our investigation shows that this impression is probably correct, but we were not able to tell whether the heart disease existed before the rheumatism and was aggravated by it, or was the result of the rheumatism. The 1868 cases were divided into two groups, one of them with hypertrophy, the other composed of those who showed no hypertrophy, as follows:

MITRAL REGURGITATION WITH HISTORY OF INFLAMMATORY RHEUMATISM

	<i>Number</i>	<i>Actual Deaths</i>	<i>Expected Deaths by M.-A. Table</i>	<i>Ratio of Actual to Expected Deaths</i>
With little or no hypertrophy	1,528	165	55.2	299%
With moderate hypertrophy	340	57	12.5	455

There seemed not to be any marked tendency for the relative mortality to increase or decrease with the duration of the policy. When divided into the three groups of insurance years, first to fifth, sixth to tenth, eleventh and succeeding, the highest ratio is for the sixth to the tenth years. By decennial ages at issue, the highest mortality, whether with or without hypertrophy, was experienced at entry ages 30 to 39, which is the same condition as was found for mitral regurgitation, with or without hypertrophy, and with no other impairments.

Where there was little or no hypertrophy, the ratio of deaths from heart disease to the total deaths was 59 per cent., and where there was moderate hypertrophy, the corresponding ratio was 61 per cent.

Dividing this material into—(a) one attack of rheumatism, (b) two attacks of rheumatism, there was little difference in the relative mortality in the case of persons without hypertrophy, but a marked difference among those with hypertrophy. Unfortunately the data are not large enough when thus subdivided to justify any definite conclusions.

Nearly 70 per cent. of the deaths were from organic heart disease, and taking all persons with a history of rheumatism the death rate from organic heart disease was about thirty times that which would have occurred from the same disease in a corresponding group of standard lives.

MITRAL REGURGITATION WITH DYSPEPSIA OR GASTRIC CATARRH

We were interested to determine, if possible, whether dyspepsia, combined with mitral regurgitation, without hypertrophy, was a serious impairment. Unfortunately the material was not large. There were 235 policies in the group, and the mortality was slightly higher than in the group of those without a record of dyspepsia.

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MITRAL REGURGITATION WITH IRREGULAR OR INTERMITTENT PULSE

There were only 297 cases of mitral regurgitation without hypertrophy, but with irregular or intermittent pulse, because the company only accepted the best of them. The experience, so far as it is dependable at all, indicates that the extra mortality is about 50 per cent. higher than for cases with mitral regurgitation without irregular pulse. This refers to the better grade of such cases.

AORTIC OBSTRUCTION

The group of risks with aortic obstruction was much smaller than that with mitral regurgitation. Indeed, it was felt to be necessary to include in this group cases with other impairments, such as consumption in the family history, a personal history of dyspepsia, malarial fever if not recent or severe, and the like. No doubt the mortality ratios were rendered slightly higher by this procedure, but their addition has had the advantage of rendering the testimony more dependable by reason of the amount of material included. In the group, aortic obstruction with little or no hypertrophy, as thus constituted, there were 3208 policies, with 227 actual deaths, and 127.1 expected, a mortality ratio of 179 per cent. A study of this material by ages at entry gives the following:

AORTIC OBSTRUCTION WITHOUT HYPERTROPHY AND WITH MINOR IMPAIRMENTS

<i>Ages at Entry</i>	<i>Actual Deaths</i>	<i>Expected Deaths by M.-A. Table</i>	<i>Ratio of Actual to Expected Deaths</i>
15-29.....	73	54.0	135%
30-39.....	77	40.0	192
40 and over.....	77	33.1	233
Total.....	227	127.1	179%

Evidently the mortality ratio increases steadily with advancing age.

When studied according to the duration of insurance, the relative mortality from the first to the fifth year was found to be higher than for the succeeding policy years, but the material is too scanty to warrant any definite conclusion.

Out of the 227 deaths, 73 deaths, or 32 per cent., were from heart disease.

AORTIC OBSTRUCTION WITH MODERATE HYPERTROPHY AND WITH MINOR IMPAIRMENTS

Including cases with other impairments, there were less than 600 policies in this group. The mortality ratio was slightly lower than that found in aortic obstruction with little or no hypertrophy, but as 60 per cent. of the actual deaths were due to heart disease the testimony of the group was evidently not to be depended upon.

FUNCTIONAL HEART MURMURS

The amount of material in this group, like that in the case of aortic obstruction, was comparatively small, and, in order to render its testimony as trustworthy as possible, it was found necessary to include in it cases presenting a history of dyspepsia, muscular rheumatism, one case of tuberculosis in the family history, and a few other similar minor impairments. The inclusion of these had the effect of raising the mortality very slightly.

There were 2622 cases, the average age was only 29, due, no doubt, to the fact that functional heart murmur is much more frequently found among young than among older men. The experience is as follows:

FUNCTIONAL HEART MURMURS

<i>Ages at Entry</i>	<i>Actual Deaths</i>	<i>Expected Deaths by M.-A. Table</i>	<i>Ratio of Actual to Expected Deaths</i>
15-34.....	54	56.1	96%
35 and over.....	34	21.0	162
Total.....	88	77.1	114%

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Of the 88 deaths, there were 15 from heart disease, which is nearly four times the normal death rate from that disease, but as 11 of these occurred in those 35 years of age or over, this higher ratio is almost entirely due to men who were granted insurance after age 34.

AORTIC REGURGITATION

Realizing the seriousness of this lesion, the company accepted these risks very cautiously, and after 1906, when the use of the lien became impracticable, it declined them altogether. The entire group, therefore, including those with other impairments, was very small, only 560 policies with 96 deaths, and a relative mortality of 440 per cent. of the M. A. Table. Of these cases 180 with rather marked hypertrophy showed a mortality of about 600 per cent. In the entire group, 55 per cent. of the deaths were due to heart disease.

ADDITIONAL REMARKS

Ever since the New York Life Insurance Company began to do substandard business, it has carried on more or less continuously a systematic study of its results in that field, and, as the volume of the testimony increased, has had to make slight changes in the standards governing its selection. The mortality has, however, continued to agree so closely with the predictions, that in recent years very little attempt has been made to analyze its experience in heart murmurs as carefully as has been done in this study. The results in most of the groups have been very well in line with the company's expectations, but in a few of them there has been a noticeable difference. This is true of functional heart murmurs at the younger ages, and also of aortic obstruction, which we have looked upon as a more serious impairment than mitral regurgitation. The present study would suggest that this may not be the case. The results obtained may be due to the more rigid selection exercised in aortic obstruction, or to the fact that in spite of

our best efforts to exclude from that group all cases of functional murmur, a fair number of them may have been included. Both of these murmurs occur at the base of the heart. Often the only distinguishing characteristic of aortic obstruction is the transmission of the murmur upwards towards or into the great vessels of the neck. It may very well be that the medical examiner, interested in finding a direction of transmission, has done so in a certain number of cases which were really simple functional murmurs. At all events we are not prepared to concede that aortic obstruction without hypertrophy is of as little significance as mitral regurgitation without hypertrophy, and we shall continue to place upon its valuation of at least 25 points higher than upon mitral regurgitation.

With regard to hypertrophy in connection with heart murmurs, the evidence points clearly to the fact that a risk with moderate hypertrophy is more hazardous than one without it. Hypertrophy means that the affected valve has been so crippled by disease that an increase in the size of the heart muscle is necessary to compensate for the lesion, and it is not unreasonable to assume that the extent of the hypertrophy, corresponding, as it must, to the needs of the damaged mechanism, probably stands in a more or less direct relation to the degree of the hazard. This study includes only cases where the hypertrophy has been moderate, and if the same mortality ratios are to be secured hereafter, the same care must be exercised in the future to exclude considerable degrees of hypertrophy.

Of the mortality ratios in mitral regurgitation, we feel a good deal of certainty. It is fair to assume a probable mortality ratio in the neighborhood of 170 per cent. in average cases, of as low as 150 per cent. in the best of them, and of as high as 225 per cent. or even 250 per cent. among the less desirable, depending upon the degree of the hypertrophy. Cases of heart murmur with a considerable degree of hypertrophy are practically uninsurable.

The evidence, too, is that any disturbance of the rhythm of the pulse is an added handicap, and that a heart murmur

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with an intermittent or irregular pulse is a more serious impairment than one without it. This is quite in accord with professional opinion on the subject, and it is to be regretted that the data were not sufficient in either amount or detail to justify more specific conclusions. It is proper to say, too, that the selection of these risks has been very rigid, and only cases with slight disturbances of rhythm have been insured at all.

At a recent meeting of the Association of Life Insurance Medical Directors, a group of 770 lives insured in the Northwestern Mutual Life Insurance Company, from 1906 to 1917, was reported by Dr. Fisher. This group showed a low mortality. It was made up of cases in which "a heart murmur was reported present at some time prior to acceptance or at the time of acceptance, but was considered of no significance . . ." and in some of them, "after repeated examinations by a competent examiner of the company, the heart had been reported normal. Others had been rejected by the Northwestern at some time in the past." All true organic murmurs seem to have been excluded from the group, so that it was substantially a composite of functional murmurs and no murmurs at all. The testimony of that study on the whole may be looked upon as giving some support to the results brought out in this study of functional heart murmurs, namely that up to about ages 35 to 40 they may be disregarded. Above that age the testimony suggests that these murmurs mean something more serious, and that they should be scrutinized with great care, and the doubtful cases treated little better than mitral regurgitation or aortic obstruction.

Attention is called to the very high mortality among those lives in which rheumatism seems to have been an underlying factor. The combination of heart murmur with a history of rheumatism seems to constitute a very serious impairment. An analysis of our material with regard to the lapse of time between the attack of rheumatism and the examination for insurance has failed to disclose any appreciable difference in the mortality ratios. Heretofore, we have been assuming

that the higher mortality known to occur among these risks was probably not far from the sum of the extra mortalities incident to each of these impairments taken separately; but this has been shown not to be the case, and hereafter such risks should be highly rated or refused insurance altogether.

Recently it has been claimed that acute articular rheumatism is often due to focal infection, and that when the source of that infection has been eliminated, a recurrence of the disease is unlikely. It may be that in our future valuations of these cases we shall be warranted in taking this fact to some extent into account.

CONCLUSIONS

Functional heart murmurs, if carefully selected, are insurable among young applicants at standard rates; among applicants over forty years of age, at rates calculated to provide for a substantial extra mortality.

Mitral regurgitation, if carefully selected, may be insured on terms to provide for a mortality of from 150 to 250 per cent., ratings above 170 to depend upon the degree of hypertrophy present in each case.

Aortic obstruction is probably 25 points less favorable than mitral regurgitation.

Hypertrophy of the heart, occurring in connection with heart murmurs, constitutes an additional impairment, and only moderate degrees of hypertrophy are insurable.

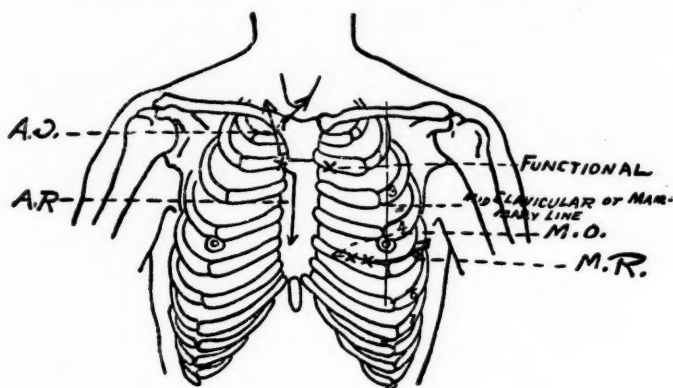
Irregular or intermittent pulse increases the hazard of heart murmurs, and if more than slight, the combination results in a very high mortality.

A heart murmur with a history of acute articular rheumatism is a very serious impairment.

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[Page 1]

Name of Applicant, _____ Date, _____



Indicate carefully the Location of Apex by X
 Indicate Area over which Murmur is Heard by O
 Indicate Point of Greatest Intensity by O
 Indicate Direction of Transmission by ———→

Is the Murmur Systolic or Diastolic?

What is your diagnosis of the case?

How much hypertrophy do you find
 —none, little, moderate, or much?

Rate and character of the pulse after
 exercise? (see other side)

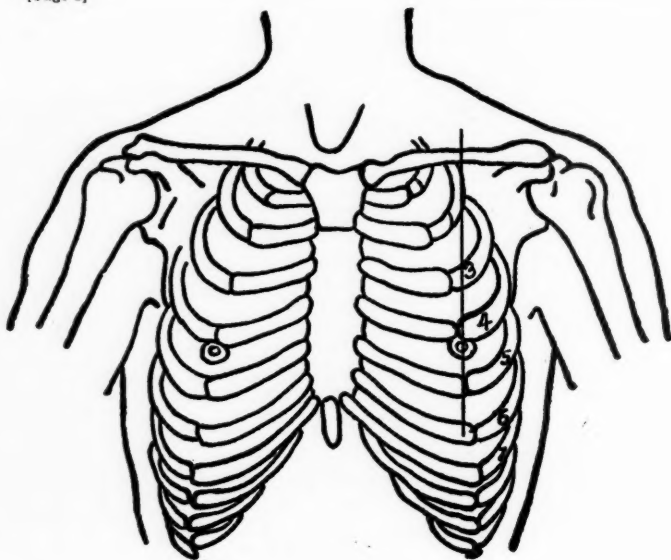
Same, two minutes later?

Are there any evidences of failing compensation such as Dyspnoea, Cyanosis, or Dropsy?

Is there any history of Tonsillar Infection, of Rheumatism or of Infectious Disease to account for the lesion? (give details)	
Any additional remarks necessary to a full understanding of the value of the risk?	

Signed _____
Medical Examiner.

[Page 2]



SYNOPSIS OF HEART MURMURS

Left heart involved in nearly all cases. Lesions of right heart are very rare.

It is always well to examine in the recumbent as well as in the erect posture. Organic murmurs persist; functional are apt to disappear with change of posture.

[Continued]

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[Page 2—Continued]

The murmurs described below are arranged in the order of the frequency of their occurrence. Other murmurs are very rarely found.

ORGANIC

Mitral Regurgitation. Systolic. Maximum intensity at apex, transmitted to axilla, heard behind at angle of scapula.

Aortic Obstruction. Systolic. Maximum intensity at right second interspace close to sternum. Transmitted upwards into great vessels of the neck.

Aortic Regurgitation. Diastolic. Replaces or follows the second sound. Maximum intensity at second right interspace to third left and downwards to ensiform cartilage.

Mitral Obstruction. Præsystolic, running into first sound. Heard in mitral area. Not transmitted. Usually accompanied by a thrill along left margin of heart area.

FUNCTIONAL

Functional. Systolic. Usually heard at pulmonic area, second left interspace or at left border of sternum. Characterized by fact that it is not transmitted, is unaccompanied by hypertrophy of heart or any other evidences of abnormality. Usually heard only in the erect posture.

BLOOD PRESSURE

Blood pressure observations are of great value in the study of a heart murmur. The auscultatory method should be used, and the diastolic as well as systolic pressure taken, both before and after exercise. If, after bending over and touching the floor six times, the blood pressure is immediately taken, the systolic should be found considerably above the normal, but dropping back within two or three minutes to the normal. If the systolic actually falls upon exertion, the myocardium is diseased. If at the same time the diastolic rises, the heart has no reserve power.

HYPERTROPHY OF THE HEART

The apex beat is normally in the fifth interspace about one inch inside the mid-clavicular or mammary line. If it is at the mammary line, the heart should be looked upon as moderately hypertrophied; if it is about one-half inch inside the mammary line, as slightly hypertrophied; if one-half inch outside the mammary line, the hypertrophy is considerable. Great care should be exercised to locate accurately the position of the apex beat.

Dr. Dwight—Mr. President and Gentlemen: Those of us who have belonged to the Association of Life Insurance Medical Directors for a number of years can appreciate, perhaps better than most others, what it really means to have Mr. Hunter and Dr. Rogers give us such papers as they have given us to-day; and we can also appreciate the courage that is required for any man to discuss such papers without preparation. Unfortunately the opportunity has not come to me to prepare a written discussion, as most of you gentlemen have done, and for that reason I will try not to burden you very long, but to call to your attention a few facts which I think it important that you should have in mind.

It is unusual, I think, that any papers from this source should depend to so large an extent upon a basis of error, if I may say so. A large part of the value of these findings depends upon a theory which we all recognize to be false, that medicine is an exact science. Dr. Symonds has suggested this, and I want to lay a little more stress upon it, for it is particularly true of the paper I am asked to discuss. I do not think it is the opinion of many men here, first, that the finding of a heart murmur is always accurate; second, that the finding of a heart murmur indicates a more or less permanent condition; and third, that it is comparatively easy to locate and describe heart disease depending entirely upon the physical examination of medical men perhaps unknown to the reviewer.

Every medical director is familiar with the difficulties of obtaining definite information even on such factors as height and weight, which are subject to measurements that can be made accurately. It is much more difficult to get a homogeneous class when the classification depends upon the findings of a large group of men working independently, many of whom are not well known to the person who is passing on those findings. For this reason, Dr. Symonds suggests that the finding of a heart murmur on one occasion may represent an absolutely different condition from the finding it or not finding it on another occasion.

Again, my own personal opinion is that the finding of heart

disease on physical examination has very little relation to the pathological findings at autopsy. A paper was written some twelve or fifteen years ago by a New York physician, Dr. Kingsbury, which was very instructive and suggestive to me. He was connected, as one of the younger men, with one of the well-known hospitals here in New York, and he classified all of the conditions found, clinically or pathologically, in two of the prominent New York hospitals, that is, wherever a heart murmur was found on examination in the wards of the hospital, it was so classified and the result checked by autopsy; and wherever heart disease was found on autopsy, reference was made to the examination as made in the wards. Only those cases were considered where an examination had been made in the hospital and where autopsy had followed. He demonstrated very well a fifty per cent. error both ways, that is, in fifty per cent. of those cases where organic disease was found on autopsy, the physical examination was entirely negative, and in fifty per cent. (or it may have been forty-five per cent. or fifty-five per cent.—I am speaking roughly), where a definite mitral regurgitation or aortic regurgitation was reported on clinical examination, the autopsy showed no such condition. The figures were large—not so large as we are accustomed to deal with—but large enough to be very suggestive.

Again, a heart murmur found at one time is not necessarily persistent, even when that heart murmur is of such a character and associated with such other signs, as hypertrophy, as to be diagnosed definitely as organic disease of the heart. Of course these findings might vary when made by different men, but even the same men, and men of great ability, will find a definite organic disease of the heart at one examination, and a year or less later, or two years later, will find an absolutely normal heart. We all recognize those conditions, and yet this criticism is not so serious as it sounds, because we are all familiar with other facts which show the value of such figures. I think this is shown particularly well in the different mortalities in connection with rheumatism and gout. I think there is probably no medical man here who would presume to be able

to differentiate in all cases between rheumatism and gout. The gout is supposed to be a rich man's disease and the rheumatism a poor man's disease, and so it goes. There is a lot of nonsense about it. Yet our own experience, and I have no doubt the experience of the New York Life, and certainly the Medico-Actuarial experience, shows that there is a radical difference between a man having had rheumatism in the foot or gout, and about all we have to go on is his own statement. So we have some very valuable statistics showing what happens when an examiner finds heart murmur, no matter whether the finding is accurate or not.

I have been very much interested in the figures as given in this paper. We are sure that we can accept them as being absolutely accurate, and that is one of the beauties of reports from that source. It goes without saying that when we make a diagnosis, or a diagnosis is made by our examiners, under the best of conditions, our own mortality figures will be approximately what the New York Life's findings have been. It is an extraordinary thing that no matter what the source of these figures is, if they are honestly and accurately made, the mortality of one company will agree very closely with that of another, modified somewhat by the methods of selection and the character of the cases that are included. Dr. Symonds again stole some of my thunder, as he always does, when he suggested that included in the group of systolic apical murmurs are a considerable number of cases which are really what we know as functional, and I would even include, when associated with a certain amount of hypertrophy. That is, if we could cut into that heart we would not find a valve leak, unless possibly a little stretching of the valve. I am disposed to believe that a large part of the improvement in mortality in that particular group is due to the introduction into it of a number of cases which really do not represent organic disease, and I question very greatly whether we shall ever arrive at that fortunate stage when medicine is an exact science, and if we could eliminate all doubtful and so-called functional cases, whether we should not find that the mortality associated

with disease of the different valves was not very closely the same.

I want to speak about this question of functional murmurs. We all know that there is a large number of cases where there are irregularities in sound in the heart, that do not represent organic disease, and in my own mind I am throwing out from that class all of those cases where the sounds are not due to the heart, that is, where they are respiratory, or of some other nature. The difficulty is to pick them out. I confess that I am absolutely at sea. I have not the remotest idea of any method by which you can pick functional hearts from organic hearts, assuming that that particular sound is made at that time. We all learn by experience, and I used to think that I could do it. Some twelve years ago we decided that we would try to pick them and we made the rule as strict as we could. We wanted the class homogeneous and we wanted them over-selected, so we began to take a certain number of heart murmurs. We never got very far, because at the end of the five year period which I had marked out in which to try the method we had found only a very few cases meeting the requirements. Our rule was first, that all such cases must be absolutely perfect in every other way, not normal, but a great deal better than normal; second, that the examination must be made by a man in whom we had every confidence; third, that the examination must be checked up by a home office man; and fourth, that in every case a special examination must be made of the circulatory system and of the urine. We issued five year term policies, not renewable, not convertible, in order that we might have a chance to examine the cases again at the end of five years. They were examined again, most of them. The numbers were very small—I have not them in mind—but we guessed wrong in just about fifty per cent. of the cases, that is, in about one half of the cases that we had assumed to be functional the guess had gone wrong. I do not mean that they had died, but where there had not been hypertrophy there was hypertrophy; where there had not been an intermittent pulse there was an intermittent pulse. Something showed that we

had guessed wrong. I have tried to get some of these men who know functional hearts to tell me how to select them. I cannot do it, and I do not believe that Dr. Rogers has succeeded very much better because his number of functional hearts is very small.

Mr. J. H. Woodward—Organic heart disease ranks first as a cause of death among the general population in the registration area of the United States. Thus the potential demand for insurance upon risks with heart impairments is undoubtedly very large while the present supply of such insurance is limited. Many companies do not accept such risks upon any terms, and those which do usually limit their maximum acceptance to a relatively small amount. The statistical information contributed by Dr. Rogers and Mr. Hunter facilitates the extension of the benefits of life insurance to risks of this type, and is thus of great practical utility.

One may gain somewhat in perspective by reading in connection with this paper the chapter on organic diseases of the heart contained in *Mortality Statistics of Insured Wage-Earners and Their Families* published by the Metropolitan Life Insurance Company. In the Metropolitan experience, nearly 12 per cent. of the deaths were from organic heart disease. "Considered irrespective of color or sex," says Dr. Louis I. Dublin, the author of the volume, "we find that the death rates for the organic diseases of the heart increase regularly with age, but show their greatest increases in the higher age periods." General population statistics have tended during recent years to show an increase in the death rate from organic heart disease, but Dr. Dublin is of opinion that a large part of this increase "is fictitious, resulting merely from changed reporting and compiling procedure."

At age 30 a little less than 5 per cent. of the deaths among the male population are due to heart disease: at age 60 over 15 per cent. of the deaths arise from that cause. The fact that heart disease is thus an increasingly important cause of death as the age advances suggests the special desirability of a study of experience by insurance years. So far as the data suffice, Dr.

Rogers and Mr. Hunter present us with such a study. In the largest group—mitral regurgitation without hypertrophy—the mortality was 184 per cent. of the M.-A. table during the first five years of insurance, 177 per cent. during the second five years, and 178 per cent. thereafter. Nowhere in the experience is there any indication that the extra mortality from heart impairments increases with the duration of the insurance. The fact that the population death rate from heart disease increases with age in greater proportion than does the combined death rate from all other causes does not mean, therefore, that among persons who are already affected with a heart impairment at the time of effecting life insurance the percentage of extra mortality may be expected to increase with the duration of the policy.

What, if any, special significance has this paper for a small company doing a substandard business? What does the paper indicate should be the attitude of such a company in underwriting heart murmur cases? These are practical questions which must interest many medical directors and actuaries. The small company is of necessity dependent on the experience of larger ones or of groups of companies, since its own exposures in the various classes are so small as to make the results of little value.

From the standpoint of such a company the principal conclusions that, it seems to me, may be drawn from the data submitted, are as follows: The three important classes of heart murmur which it is necessary to practically consider are: (1) functional murmurs; (2) mitral regurgitation without hypertrophy; and (3) aortic obstruction. Other classes of heart impairments show so high a mortality that, if considered at all, this should be done only exceptionally.

The authors of the paper in their conclusion state that "functional heart murmurs, if carefully selected, are insurable among young applicants at standard rates; among applicants over forty years of age, at rates calculated to provide for a substantial extra mortality." Does it not follow that rather than prescribing an abrupt change in treatment at age forty these

cases should be rated on the basis of mortality percentages increasing with the age at entry? To be sure, the available material in this group was somewhat restricted in amount. Nevertheless, it served to verify one's preconceived idea that the effect of this impairment should be given a gradually increasing weight as the age at entry increases.

The authors conclude that "mitral regurgitation, if carefully selected, may be insured on terms to provide for a mortality of from 150 to 250 per cent., ratings above 170 to depend upon the degree of hypertrophy present in each case." Assuming that a company does not care to accept cases of mitral regurgitation with well-marked hypertrophy in excess of what is required to provide normal compensation, does not a study of the experience in this class according to build indicate that these cases should be rated according as they are underweight, average weight, or overweight? It seems probable that the combined effect of overweight and a mitral regurgitation is more serious than would be indicated by combining additively separate ratings for the heart impairment and for the overweight.

There remains to be considered the group of risks with aortic obstruction. As to these the authors of the paper conclude that "aortic obstruction is probably 25 points less than mitral regurgitation." They do not present a study of aortic obstruction arranged according to build. They give us, however, a study of the material by age at entry which shows that the tendency is toward a very heavy increase in the ratio of actual to expected deaths as the age at entry increases. This contrasts with the experience in the mitral regurgitation group where the indications are that the degree of extra mortality is independent of the age at entry. In view of these facts, should not aortic obstruction be rated upon a scale increasing sharply with the age at entry, applicants at the higher ages being declined altogether? As to this particular impairment, it appears to be an impression that accurate diagnosis is more difficult than in the case of mitral lesions, and that a fair proportion of medical examiners, especially in the rural districts, will not

display that degree of infallibility that might be desired. This suggests the obvious but rather important general conclusion that one company cannot expect to reproduce the results of another unless its medical examiners are of the same average degree of efficiency.

In general, the rating of heart murmur cases presents practical problems similar to those attending the rating of other sub-standard business. Great accuracy in rating is of vastly less importance than substantial uniformity of practice among the several companies. It is highly desirable from the standpoint of public policy that different companies should treat similar impairments in a similar manner. The underwriting of sub-standard business, involving as it does so extensive an exercise of personal judgment in particular cases, is peculiarly exposed to the evils which have manifested themselves in other branches of insurance wherever competitive rate-making as to individual risks has prevailed. The objection to competitive rate-making is that instead of producing greater equity in rates it nearly always produces inequity, inadequacy, and discrimination. It seems to me, therefore, that until companies writing sub-standard life insurance are able to devise some coöperative system for securing uniform practices they can hardly do better than to base their action as closely as may be on the conclusions of Dr. Rogers and Mr. Hunter. Such a policy will make for better field conditions and encourage a belief on the part of the insuring public that the companies know what they are doing.

Prevention and conservation are being increasingly recognized as an integral part of all systems of insurance. Is not a life insurance company transacting substandard business in a position to render specialized conservation service of the highest value? Is it not falling short of its full opportunities for usefulness if it fails to furnish to its members who are received into the organization in an impaired condition of health the fullest and most highly specialized information as to means of removing the impairment or checking its deteriorating influence? Aside from its social value such a scheme might in-

cidentally prove to be good business in the narrower sense through some resulting reduction in mortality costs.

Dr. Jaquith—The paper under review is "a study of the mortality experience of the New York Life Insurance Company in certain male risks looked upon as substandard by reason of heart murmurs."

It is impossible for me to write a detailed review of this paper based on independent facts pertaining to the various kinds of heart murmurs so thoroughly analyzed by the joint authors of the paper in question.

However, a few years ago our company made a study of a mortality experience with five thousand lives rejected for insurance but upon which policies were already in existence—such policies having in many cases been issued a number of years before. The medical reports on which the above rejections were based did not give details enabling us to subdivide the heart murmurs in a manner corresponding with that adopted by Dr. Rogers and Mr. Hunter; so the next best thing was to examine the three main groups dealing with heart troubles as we investigated them.

The results in these groups confirm in general the conclusions stated in the paper under discussion. An exception may be noted, however—that is, that our percentage of actual of expected loss by the American Experience Table of Mortality for "functional cardiac trouble," viz. 274.86 seems high as compared with 218.56 and 222.64, respectively, in the other groups. The explanation of this probably is that there were included in this group a number of cases in which other serious impairments were present—a fact brought out by a separate study which we made of "cause of death" compared with "cause of rejection."

With these preliminaries I proceed to a more detailed statement, remarking that while the figures appended are not exactly comparable with those in the paper they have the value attaching to an independent study of facts along collateral lines, the observer being stationed at a different viewpoint.

Some points of comparison between the New York Life

figures and those given here are as follows: In the former the business included is under average from its inception; in the latter rejected lives *having previous insurance in force* are considered. In the former the classification is by Ages at Entry, in the latter by Ages at Rejection, as well as by Policy Years of Duration. Their figures are by amounts, also by policies; ours are by lives. The former employs the Compound Progressive and the M.-A. tables of experience for comparison with the actual. We use the American Experience Table in the main, but in the group totals have estimated the corresponding percentages by the M.-A. table. The former considers only heart murmurs (with or without hypertrophy, rheumatism, etc.). We deal with heart murmurs, functional cardiac trouble and "diseases of the heart"—this larger group including fatty heart, heart disease—not specified, hypertrophy of heart, besides the two smaller groups first mentioned. The New York Life's experience was carried through the policy anniversary in 1918, ours through the same in 1914.

Our results by lives are as follows, the figures being arranged in a form suitable for comparison with those in the paper in question.

HEART MURMURS

NUMBER OF LIVES, 369

Policy Years of Duration	ACTUAL LOSS	EXPECTED LOSS		PERCENTAGE ACTUAL OF EXPECTED	
		Am'n	M.-A. (estimated)	Am'n	M.-A. (estimated)
1- 5	47	19.249		244.17	
6-16	15	9.118		164.51	
Total	62	28.367	20.424	218.56	303.50

DISEASES OF THE HEART

(878 LIVES)

1- 0	129	48.498		265.99	
6-23	41	27.858		147.17	
Total	170	76.356	54.976	222.64	309.23

Note that heart murmurs show by the percentage of 218.56 that they result in an experience closely approximating the larger (inclusive) group which has a percentage of 222.64.

FUNCTIONAL CARDIAC TROUBLE

(423 LIVES)

Policy Years of Duration	ACTUAL LOSS	EXPECTED LOSS		PERCENTAGE ACTUAL OF EXPECTED	
		Am'n	M.-A. (estimated)	Am'n	M.-A. (estimated)
1- 5	78	24.115		323.45	
6-23	25	13.359		187.15	
Total	103	37.474	26.981	274.86	381.75

Actuaries will be interested to know how the percentages show by Ages at Rejection; so I append this table:

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MORTALITY EXPERIENCE ON REJECTED LIVES

BY AGES AT REJECTION

Accumulated Experience of All Policy Years Since Rejection. Percentages Actual of Expected Loss by American Experience

Ages at Rejection	Functional Cardiac Trouble	Heart Murmurs	Diseases of the Heart
15-34	311.45	166.48	205.31
35-69	265.39	245.25	228.58
Total	274.86	218.56	222.64

It may also be of interest to give the results of the entire Rejected Lives Mortality Study referred to, five thousand cases being considered:

Policy Years	ACTUAL LOSS	EXPECTED LOSS		PERCENTAGE ACTUAL OF EXPECTED	
		Am'n	M.-A. (estimated)	Am'n	M.-A. (estimated)
1-5	490	245.961		199.22	
6-26	253	160.095		158.03	
Total	743	406.056	292.360	182.98	254.14

Besides the three "heart" groups above dealt with, the Rejected Lives Experience included cases under the following Causes of Rejection:

	P. C.
Lung Disease.....	313.97
Diseases of Lung and Throat.....	250.28
Albuminuria.....	244.48
Glycosuria.....	173.74
Genito-Urinary.....	211.01
General Diseases.....	210.69
Moral and Insurance Hazard.....	170.43
Non-Conformity.....	246.60
Total.....	182.98

These percentages are based on the American Experience Table.

It is felt that the figures contained in this discussion are not nearly as valuable as they would be if we were able to show from our data specific subdivisions of heart impairments to compare, point by point, with those so instructively discussed by Dr. Rogers and Mr. Hunter. These facts are submitted, however, in the hope that they may throw some new light on this very interesting subject.

Dr. Brathwaite—Realizing the possibility of repetition, and with an appreciation of the able discussion by those who have preceded me, it is well to emphasize that this interesting paper is based upon a study of mortality experience of a company doing a large sub-standard business and is, therefore, an analysis of over 10 years' experience in the sub-standard mortality of heart lesions of certain types.

It is based upon the actually observed mortality of a considerable number of cases, accepted for life insurance with known heart lesions, and as such is a volume of testimony of no mean proportion.

For the purpose of life insurance selection, these studies must eventually have great weight, and as compared with clinical studies in prognosis are of much greater value, as they take into consideration those cases not only observed at entrance, but at exit.

Clinical knowledge and experience, unless obtained in institutions where accurate histories and records have been continuously kept, are largely confined to individuals, rather than collections of them, or classes. A clinical study, even if obtained by long experience with accurate records in institutions other than life insurance companies, has to do with cases of admittance or entry, rarely with continued observations over subsequent periods of life. To put it in another way, the "exposures," numerically speaking, taken collectively, as at entry and exit, for any typical condition, must needs be, in the experience of any individual clinician, conspicuously small. It is all the more interesting, therefore, that so large an experience as the one described in this paper gives us the significant interpretation of medico-ac-

tuorial methods of investigation rather than the clinical aspect.

It is interesting to note, among other things, that the insurance value of a risk is the summation of the insurance value of its component factors, and that in making application of this study, that fundamental assumption has been followed, as by practical experience we find that this assumption is, in our work, of ever-increasing moment.

The use of a special blank, upon which the medical examiner is required to describe graphically his findings, that is, his diagnosis, is essential. Experience has shown by its use how necessary such an expedient is. If any criticism on the use of special blanks which have come under our observation is pertinent, it is to the effect that the area of true cardiac hypertrophy is not accurately demonstrated, in practice, by the graphic method designed for the purpose, unless it is considerable, and we are prone to the belief that none but rather extreme cases of hypertrophy will be reported by the use of the special blank, even by careful examiners, while the casual ones will report moderate hypertrophy, perfunctorily, because they know it ought to exist. The blank most certainly serves a useful purpose in identifying the lesion and as a check upon the examiner's qualifications.

On the special blank referred to, the nipple is depicted at the costo-chondral articulation. Whether it should be so placed, or outside the costo-chondral line, is debatable, as is also whether the nipple is the best guide in determining the degree of hypertrophy, taking into consideration the varying positions of the heart normally.

From the paper it appears that the writers have tabulated the mortality from the study of 8307 insured lives with mitral regurgitant lesions and more with other impairments than that of heart lesion itself. We doubt whether any other as comprehensive a study along these lines has ever been attempted, and the appreciation of the value of this study and paper will no doubt be fully realized by those most interested in extending insurance benefits to the

greatest number, long after the writers have gone to their well-earned rest.

Referring to the second paragraph, it may be well to emphasize, for the sake of companies which have had no experience in issuing sub-standard business, that the same impairment sometimes does show different results in different companies, due, no doubt, to the way in which the questions of selection are handled.

The third paragraph may be misconstrued by the representatives of companies not using the numerical system. It is justifiable to add that the question of what constitutes a "component factor" is exceedingly important. For example, illustrations can be found in this paper to show that a heart murmur should not be taken as one component factor and another impairment, such as hypertrophy, or irregular pulse, as an independent factor, but the combination of the two should be treated as one impairment. The authors lend weight to this view in the third sentence of this paragraph. The table, "Mortality Experience, According to Build" in mitral regurgitation without hypertrophy further emphasizes this, because it shows that weight should not be treated as an independent factor, but rather as a part of the heart factor.

I have recently had the privilege of a conference with one of the few medical officers of the United States army, who was sent by our Government at the request of the British to participate in the activities of the British Heart Hospital, under the jurisdiction of Thomas Lewis, University College Hospital, a leading authority on heart lesions in the United Kingdom. While the work of a medical selector in military service is guided by the requirements of military service, inasmuch as his criterion is fitness for physical effort, and not longevity, there are points of great interest between that type of work and that of the selector of life insurance.

One of the points of common interest was the fact that, in the service of that hospital, a very large one, the constant effort to ascertain hypertrophy of the heart was one of the predominant features in the selection for military service, a heart

murmur itself being, one might almost say, in many instances, of secondary importance.

While this is interesting, from our standpoint, it must be borne in mind that the mortality illustrated by the paper under discussion is based upon (in the case of mitral regurgitation) systolic murmurs at the apex reported as valvular lesions, so that the fine points of diagnosis as to whether these are really incompetent mitral valves or not, are more or less academic.

The nipple line was used in Britain as the most practical point for determining hypertrophy, with reference to the position of the apex, and not mensuration from any bony point, any apex without the nipple line being classed as hypertrophy and, in general terms, the distance outside that line being considered directly proportional to the degree of hypertrophy.

Palpation, and not percussion, was considered to be the more practical and exact method of determining the left border of the heart, palpation being used to determine the furthest point left at which the apical impulse was felt.

Systolic murmurs at the apex were not considered as true evidence of organic disease when not accompanied with true hypertrophy. Systolic murmurs without hypertrophy were found in many soldiers with otherwise negative hearts and negative history of an etiologic factor and a high "exercise tolerance." An extraordinary degree of "exercise tolerance" in heart lesions was definitely established.

Many cases of organic disease, including aortic lesions had "carried on" in the trenches surprisingly well for long periods of time. However, none were retained in the army but a few of the less serious cases, and these were placed in home service. No organic disease was sent back to the trenches. Mild cases of organic disease with high exercise tolerance were the only ones retained in the service.

Mitral stenosis may not be accompanied by demonstrable left ventricle hypertrophy.

From the standpoint of significance, it was considered that among the most important causes, or complicating conditions,

in order of gravity, were rheumatic fever, syphilis, chorea, recurrent tonsillitis, and possibly other focal infections.

Regarding the relative frequency of various heart lesions, it may be of value to quote the statistics of the Edinburgh University Hospital, as given by Sir William Osler in his "System of Practice of Medicine." An analysis was made in 1914 of 2368 cases of cardiac lesion, in which valvular disease was found (approximately 80%) divided as follows:

	<i>Alone</i>	<i>Combined</i>	<i>Total</i>
Mitral insufficiency	585	463	1048
" stenosis	304	257	561
Aortic insufficiency	140	336	476
" stenosis	40	152	192

Sir William Osler also states that in his own experience he places the ratio of occurrence of aortic regurgitation to aortic stenosis as 7 to 1 in private practice, and 10 to 1 in hospital practice.

In the table, "Mitral Regurgitation Without Hypertrophy (no other impairment)," it may be well to call attention to the fallacy which used to prevail in certain quarters that mitral regurgitation was far more serious at ages of entry over 40 years than at younger ages. In fact, we believe it was sometimes considered to be almost insignificant at younger ages. That a mitral regurgitant murmur is a serious impairment at all ages, is brought out by this table, and also the ratios in the paragraph explaining the analysis of this experience, according to policy years, which ratios would presumably increase with duration, if the seriousness of the impairment increased with age. The fallacy alluded to may have been produced by fixing the attention on deaths due to heart disease, without taking into consideration the lowered resistance against other diseases because of the heart impairment. An illustration of this occurs in the sentence referable to Bright's disease and pneumonia showing that the lowered resistance was important, as the death rate from those diseases was double the normal.

Functional heart murmurs: It is our understanding that one of the chief difficulties in handling heart impairments is in the diagnosis itself. Realizing that the diagnosis of functional heart murmurs is particularly difficult, any inconsistency in the results reported should be accepted with caution.

The authors admit, in their additional remarks (first paragraph), that a fair number of functional murmurs may have been included in the group of aortic obstruction. Is it not possible, therefore, that in the class of functional murmurs the marked increase of mortality for ages at entry 35 and over, as compared with the younger entries, is due, in part at least, to the inclusion of a certain number of true organic murmurs, possibly aortic obstruction? It occurs to us in this connection, therefore, that a company should be extremely cautious about accepting functional murmurs at anything like standard rates, unless its medical facilities are exceptionally good.

Mr. Mead—The life insurance profession is very greatly indebted to the authors of this paper on heart murmurs, not only for the reason that it is the first extensive experience, if indeed not the first specific experience, on heart murmurs, which has ever been published, but also for the very skilful manner in which the subject has been treated.

The experience on mitral regurgitation embraces 7025 cases without hypertrophy and 1282 cases with hypertrophy, a total of 8307 cases, not giving a history of rheumatism, whereas the experience embraces only 1868 cases with history of rheumatism. I had supposed, judging from our own limited experience and from information received elsewhere that there would be a larger proportion of mitral regurgitation giving a definite history of rheumatism. I believe it is the general supposition as to the general condition among the population at large, for it is generally believed that the most common etiological factor in connection with mitral regurgitation is inflammatory rheumatism. In view of the heavy mortality experienced in connection with those having a history of inflammatory rheumatism it might well be supposed that the small class is due to the fact that most of them have been de-

clined. However, in view of the fact that the authors later on in the paper state that they had, at least up to the time of the compilation of this experience, added to the percentages for a simple mitral murmur the customary percentages for inflammatory rheumatism, which the authors' later paper indicates to be only +10 to +30%. We therefore have reason to believe that comparatively few of the cases were declined, and hence it would be interesting to have an explanation as to the small proportion of those having a history of inflammatory rheumatism. I should also like to inquire whether it has been the practice of the company in connection with cases showing a heart murmur without a history of rheumatism to write back to the examiner to question the applicant as to history of rheumatism or any other etiological factors.

In view of the general opinion that the predominating etiological factor in connection with mitral insufficiency is inflammatory rheumatism it is hard to reconcile the high percentages where a definite history of rheumatism has been given as compared with the comparatively low percentages where a history has not been given. Is it possible that included within the latter class are a large number of functional murmurs? It would be difficult to suppose that such was the case, however, in view of the remarkably efficient heart blank which the company has been accustomed to use, copy of which is appended to the end of the paper. It would be interesting in this connection to know whether this heart blank was used during the entire currency of the experience.

In view of this experience, looking at it from another standpoint, it is quite reasonable to suppose that a larger percentage of heart murmurs are due to other etiological factors than inflammatory rheumatism than has been generally supposed among the medical profession, at least that portion of it which is closely associated with the life insurance business. It is quite possible that the infections from the teeth and tonsils, for instance, take a more direct route to the heart than by way of the inflammatory rheumatism course, the infection being sufficient to affect the heart but not sufficient to involve the

less delicate tissues of the joints. The heavy mortality in connection with the rheumatic cases indicates as an aid to selection the query to the examiner as to whether the etiological factor causing the rheumatism has been removed. We would be interested to know whether the New York Life has adopted any such procedure.

It is realized of course that there are many difficulties in this direction in connection with the particular limitations of the usual life insurance examination facilities. It might be asked whether the New York Life deems it advisable to include as a supplementary question, particularly in connection with heart murmurs, whether there is any apparent infection of the tonsils or teeth or whether such has been detected in previous treatment of the applicant.

We might also inquire whether the heart blank is regularly in the hands of their examiners and is completed if they find evidence of a murmur, or whether the blank is sent to the examiner to supplement the information contained in the original examination.

Another striking feature of the paper is the large proportion of cases of aortic obstruction, particularly in view of the high ratings which must have been given cases of this type, causing no doubt a large rejection or a larger proportion of not taken policies on those actually issued.

The aortic obstruction cases embrace 3208 policies as compared with a total of 10,175 cases of mitral regurgitation. The rarity of aortic obstruction doubtless renders its likelihood of detection by the usual examiner much less as compared with the mitral or aortic regurgitation. Furthermore, the New York Life calls attention to the fact that the aortic valve, presumably including both regurgitation and obstruction, is involved in only one-fourth as many cases as the mitral valve, whereas their experience on aortic obstruction alone, aside from aortic regurgitation, is over 30%, aortic regurgitation embracing about 6% more, making a total of 36%. This would lead one to believe, especially in view of the higher ratings and the greater possibility of declination and not taken,

that there might have been included, especially in these aortic obstruction cases, murmurs of another type. However, the carefulness of the blank prepared for the purpose of obviating this feature would cause our opinion to waver in the other direction. It would be interesting to have some expression from the authors of the paper on this point.

In their more recent paper on the general subject of numerical ratings it is indicated that an applicant might receive a credit of from 30 to possibly 50% on their rating against their debits, provided that none with a definite physical impairment would ever be granted insurance at standard rates. Would it be asking too much to inquire if the Company, say, would give as much as a 40% credit against a mitral regurgitant murmur which would otherwise be rated +75%, thus making the extra rating for instance, 35% in case the heart murmur were the only impairment.

Dr. Rogers—With regard to the heart blank, that like a great deal of our work in sub-standard business, was an evolution. We started out with the skeleton outline and with instructions how to use it. We have gradually added other features, the latest of them being to indicate the mid-clavicular or mammary line on the skeleton and to give the examiner more specific instructions about locating the apex beat, and regarding the importance of hypertrophy. We are satisfied, as you who have read the paper must be, that noticeable hypertrophy of the heart is a very important index to the extent of the damage that that organ has suffered.

With regard to functional heart murmurs, it is getting to be a fashion in some offices to look upon functional heart murmurs examined by skilled examiners with a good deal of indulgence. I should like to say a word on that subject. I have in mind a death loss which occurred only recently in our office. The case had been insured only a short time before as a standard risk, his examination having been made by a very competent examiner, as competent as any I know, and he found him to be in thoroughly good condition. A few months later, we learned that he had some disturbance of the heart, and an in-

termittent pulse. A little later he was found to have a heart murmur, still later that heart murmur disappeared and only an intermittent pulse remained, and seven months after the date we insured him as a standard risk he died. In the meantime, however, he had been very thoroughly examined by one of the best clinicians in this country and had been pronounced all right. He died within three months of that expert opinion. I suppose that a good many of our functional heart murmurs will die in pretty much the same fashion, only let us hope not quite so soon.

The fact of the matter is, with regard to heart murmurs, they are the best guides we have at the present time. Nothing truer has been said in our Association than the remark made by Dr. Dwight this morning about the limitations of human skill to find out what is going on inside the body. The human being is not like a watch, a thing that you can open up and take apart and examine in detail, wheel by wheel. You are able only to apply your ear to the outside of the watch to judge in so far as you can, from the way it ticks, whether it is all right or not, but you cannot look inside of it. It is that difficulty which is going to make the question of so-called functional heart murmurs a difficult one for our companies to solve. I think that the results of the analysis of our cases offer us what we should tie to at the present time, and in the present state of medical knowledge and of medical skill. If we insure risks of this sort in the future, we should all remember that the results which have been brought out in this and similar investigations do not express what actually occurs in cases of mitral regurgitation or of aortic obstruction or of any other heart lesion. They express what is likely to occur hereafter in cases which are reported to have that condition. We are not dealing with exact facts, we are dealing with the representations of facts. We are not dealing with things as they are, but rather with things as they appear to be, as seen through the eyes of reasonably intelligent, reasonably good judges.

Referring again to functional heart murmurs, the criticism made this morning in one of the papers is a very sound one,

namely, that the significance of a functional heart murmur does not suddenly become a matter of consequence at age 40. It is, however, at age 40 or thereabouts, perhaps somewhere between age 35 and age 45, where the line of mortality passes from the normal at the younger ages to the decidedly abnormal at the older ages, where indeed the mortality becomes too high to be safely insurable at standard rates.

Personally I feel obliged to modify my former views on this subject, and to believe that the significance of purely functional heart murmurs is very slight at the younger ages, and that it gradually rises until at age 35 to age 40, we should begin to pay a good deal of attention to it.

Mr. Moir: We shall now proceed to the discussion of the subject: "How should overweights be treated on the basis of recent studies?" Dr. J. W. Fisher will open the discussion:

Dr. Fisher—The Northwestern Mutual Life Insurance Company has made four investigations of its mortality on the class of cases designated as excessive weights. The first was composed of risks accepted by the Company during the years 1858–1885, both inclusive, and was conducted by the late Emory McClintock in 1886, being the first investigation of the kind in this country, in so far as I have any knowledge. The data was divided into two general classes: First, family record showing neither parent reported dead under age 70; second, at least one parent reported dead under age 70. The mortality in Class Two was found to be 33.2% greater than in Class One.

The second investigation was composed of the issues of 1886–1895, inclusive, but unfortunately did not take into consideration longevity in the family record. The risks were divided into two classes: One, those in which the weight was from one to fifteen pounds in excess of the maximum, and two, those in which the weight was more than fifteen pounds in excess of the maximum. The mortality was computed by the

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Actuary's Table, full tabular expectation by policies. In Class One the mortality was found to be 20.37% greater than the average mortality of the company covering the same period, computed by amounts; in Class Two, 38.67% greater than the average.

In the third investigation, the data was composed of issues of the years 1885 to 1900, being portion of the data furnished by the company to the Specialized Investigating Committee. It will be recalled that in the specialized investigation, the data was divided into classes in which the weight was 30% or more in excess of the average and those in which the weight was from 20% to 30% in excess of the average. In both classes the data was divided into those showing longevity in the family record and those in which no longevity was shown. The mortality was 20.27% greater in those whose weight was more than 30% in excess of the average weight and longevity not shown in the family record. In the two classes in which the weight was 20 to 30% above the average; where longevity was shown in the family record the mortality was 7.59% below the general average of the company covering the same period, and in the class of the same average weight, but without longevity shown in the family record, the mortality was 5.91% greater than the general average mortality of the company. The class in which the weight was in excess of 30% above the average and longevity shown, was not investigated. It will be recalled, in the specialized investigation, the mortality was 30% higher in the class in which longevity was absent from the family record and the weight more than 30% in excess of the average weight, and in the class in which the weight was from 20% to 30% over the average, with longevity shown in the family record, the mortality was 20% more favorable than in the same weight class, without longevity in family record.

The fourth investigation comprised the data furnished the Medico-Actuarial Committee, numbering 8418 records of policies in which the weight was over 35 pounds in excess of the average. 2112 cases were under age 35, with a mortality by the Medico-Actuarial Table of 114.15%. The mortality of the

8418 cases, all ages, 20 to 62, was 124.49%, as compared with the remaining forty-two companies, of 141%, a difference of 16 points in favor of the Northwestern, which no doubt was largely due to the consideration of longevity in the family record.

The conclusions to be drawn from a study of the mortality results as shown by the several counts of the Northwestern and those of the Specialized and Medico-Actuarial investigations, are that the more excessive the weight, the higher the mortality, especially at ages 35 to 50. It is to be regretted that the Medico-Actuarial investigation did not take into consideration the element of longevity in the family record of excessive weights, as was done in the Specialized investigation. I am convinced that excessive weights which show that heavy weight is a family trait and show longevity in the family record, will give, at any age, a more favorable mortality, of from 20% to 30%, than where those elements are absent, and that a fairly favorable mortality can be secured on those under age 35 and over age 50, especially where the weight is not more than 35% in excess of the average. Excessive weights whose family record does not show longevity and whose weight is more than 25% in excess of the average, as a rule, in my opinion, should be considered as sub-standard, and should be insured at a higher premium rate. Certain classes of excessive weights, to my mind, can profitably be insured under short term endowment. No other class of risks lends itself to a more equitable and just rating.

Mr. McKechnie—In the treatment of overweight lives applying for life insurance, it seems desirable for a company to have a definite limit of overweight within which lives will be accepted without extra rating. In the past a table of 20% over the average has been used by many companies. Such a table based on the new build table gives values varying from 23 lbs. to 41 lbs. above the average and shows, according to the ratios in the report of the Joint Committee, a mortality varying from 96% to 147%.

I think there is a tendency to change from such a table to

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one based on an absolute number of pounds over the average. Mr. Little, in his paper in volume xv. of the *Transactions* recommended such a change, and in the discussion of Mr. Welch's paper in volume xvii., Mr. Rhodes stated that it would be very desirable to discard the height and weight table now generally in use, which shows 20% over and under the average, and he suggested that a new table based on 25 lbs. over the average and stated that, other conditions being favorable, he would accept all overweight lives within this maximum on the Ordinary Life plan without rating up.

A table based on 25% overweight shows a mortality varying from 98% to 123%. The variation is considerably less than that of the 20% overweight table but, while such a table might be satisfactory at the middle and older ages, it creates too low a limit at the younger ages.

Moreover, both the 20% and the 25 lbs. overweight tables have the added disadvantage of being rather cumbersome, since the maximum weight has to be shown, not only for variations in height but also in age.

I think that advantage should be taken in this connection of the feature of the tables published by the Joint Committee in which for a given height and a given rate of mortality the weight remains fairly constant irrespective of age. For example, if a table is prepared for men 5 ft. 7 in. in height, showing for each age the weight corresponding to 120% mortality, it will be found that the lowest weight therein is 184 lbs., and the highest 190 lbs., so that a maximum of 187 lbs. will be within 3 lbs. of the exact figures. Similarly with men 5 ft. 0 in. in height, a weight of 158 lbs. will never differ by more than five pounds from the exact weight corresponding to 120% mortality. This small variation applies to all men from 5 ft. 0 in. to 5 ft. 10 in.

When we come, however, to tall men, that is, 5 ft. 11 in. and over, it is found that the variation is somewhat greater, and there is also the apparent anomaly from a practical standpoint that the limit for men 5 ft. 11 in. would be actually less than that for men 5 ft. 10 in. This seems to be a rather awkward

feature of the table issued by the Joint Committee, that is, that at the younger ages, men 5 ft. 11 in. in height will be rated up for a certain build, although actually weighing less than men 5 ft. 10 in. in height, who would be accepted without rating up. This feature of the table is largely due to the fact that men over 5 ft. 10 in. in height under age 40 can never show a normal mortality, no matter what their weight may be. With men of medium height and short men this is not the case, and it has been suggested that this apparent discrepancy may have been due to a selection by the companies in the past which discriminated against the shorter men as being under-developed while favoring the tall men as being well developed.

To make some allowance for this, and in order to make the suggested table of maximum weight run smoothly, a table could be prepared showing the weight corresponding to 120% mortality for each height and age, except that for tall men at ages 20 to 39 a mortality of 130% is shown. By taking the mean of the highest and lowest weight for all ages at each height, the following table will result:

<i>Height</i>	<i>Maximum Weight</i>
5 ft. 0 in.	158
5 " 1 "	160
5 " 2 "	162
5 " 3 "	165
5 " 4 "	168
5 " 5 "	172
5 " 6 "	177
5 " 7 "	183
5 " 8 "	189
5 " 9 "	194
5 " 10 "	199
5 " 11 "	203
6 " 0 "	208
6 " 1 "	213

A committee of actuaries of the majority of the Canadian companies considered this question some time ago and recommended a somewhat similar table. Their table was based on a maximum weight corresponding to a mortality found by

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adding twenty points to the mortality shown for the average weight. The table recommended was as follows:

<i>Height</i>	<i>Maximum Weight</i>
5 ft. 0 in.	154
5 " 1 "	156
5 " 2 "	159
5 " 3 "	162
5 " 4 "	165
5 " 5 "	169
5 " 6 "	174
5 " 7 "	179
5 " 8 "	184
5 " 9 "	189
5 " 10 "	194
5 " 11 "	199
6 " 0 "	204
6 " 1 "	210

It will be noticed that a table such as either of the above is much more convenient for practical use than the table based on 20% overweight or 25 lbs. overweight and can be said to fairly well represent a more uniform limit as regards expected mortality than either of the other two.

If a company wished to adopt a table of maximum weight showing some rate of mortality other than 120%, the same general feature of practically no divergence in the weight according to age would apply.

In addition to recommending a table of overweight, the majority of the Canadian companies through the committee above referred to have adopted the following rule for rating up overweight lives. To find the number of years rating up, divide the number of pounds above the maximum by:

<i>Age Group</i>	<i>Weight Unit</i>
20 to 34	4 lbs.
35 " 44	5 "
45 " 53	6 "
54 " 59	7 "

The ratings so found would be applied to the Ordinary Life plan.

Dr. Root—Mr. Chairman: The practice of the *Ætna* in treating overweights has varied considerably during my experience with the company. Many years ago we adopted a somewhat rough and ready process of issuing only Endowment Insurance or Short Term contracts, based largely on guess, the best guess the medical department could make as to the probable longevity of the individual,—of course an absurdly empirical and unscientific proposition. Later on, when the investigations of the M.-A. were published, and after considerable study of our own experience, our actuaries devised a table based on the normal mortality curve and the mortality curve of overweights of 10, 20, 30 and 40% over the standard for the height and for the years. The interesting thing brought out, as we all know, was that the mortality rate was constant over the earlier ages, and did not necessarily rise abruptly during the middle ages in life, and as a result of that, Mr. Cammack, our Associate Actuary, has prepared tables which virtually make the rating for the treatment of overweights an actuarial rather than a medical problem. These cases are given ratings, advances in years, varying from three to eleven years, according to their age and according to the degree of overweight over the normal standard, and with occasional modifications for family history and excess girth over chest measurements; but as a matter of general practice, and of routine, our agents are instructed that the medical department has nothing to do with advancing the rate; in other words, we consistently and systematically side-step it so far as possible, because the ratings are fixed and are absolute, and we rate for Endowment or Short Term contracts equally with the low premium policies; in other words, the mortality curve which parallels the normal mortality curve is followed logically throughout the entire case. I am not at all satisfied as to the fairness or the complete accuracy of that measure, but I am thoroughly satisfied that for the present it is reasonably safe and satisfactory.

Mr. W. A. P. Wood—As I am not the Wood that is down on the program, and as it was only two days ago that I was asked to discuss this subject, I have merely had an opportunity to

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jot down a few things in regard to it, and I find that these have been pretty well covered by Mr. McKechnie who has preceded me.

There are a couple of points, however, to which I wish to call your attention in regard to overweights. Two things should be remembered in connection with the tables shown in the report of the M.-A. Committee dealing with overweights. The first is that, there being three separate build groups, we are apt to have a considerable jump in the mortality ratings between groups. You will observe that this will occur in quite a number of cases. For instance, in Age Group 20-24, for a man 5 ft. 10 in. tall and 50 pounds over the average weight, the mortality is 127 per cent, whereas for those in the same age group and the same amount of overweight, but being half an inch taller, the mortality is 140 per cent, that is, a difference of 13 per cent. Now we are bound to have such differences where there are three separate build groups.

Another point to which I wish to direct your attention is the fact that the experience being a 24-year experience, errors are apt to occur in the mortality shown for the younger lives. I think perhaps the Committee has tried to cover that to some extent, but it seems to me that these errors have not been entirely eradicated. You will notice that the mortality for the tall young underweights is quite unfavorable, and for entrants who are tall underweights but older, the mortality is quite favorable. Accordingly, if we had a longer period of exposure than 24 years, I believe that the experience on the younger entrants would benefit by the more favorable mortality of the later years, and in this way the mortality of the tall young entrants would be more favorable than that indicated in the report of the M.-A. Committee.

Mr. McKechnie has spoken of a table prepared by the Actuaries' Club of Toronto, which did not take into account the age but merely the height of the assured. Such a table might, I think, to some extent overcome the difficulties referred to above. In this table, as now used by a number of Canadian Companies, an allowance of about 20 per cent. extra mortality

is made, that is, the maximum weights given in the table correspond to a mortality 20 per cent. higher than those produced by persons of average weight. If persons of a certain height of average weight would show a mortality of 95 per cent, the 20 per cent. added to that would be 115 per cent. If those of average weight showed 105 per cent, then the maximum weight given in the table would be 125 per cent.

I have just had prepared a table showing what would be produced in the way of maximum weights with an allowance of 25 per cent. instead of 20 per cent., and you may be surprised to find the uniformity there is for the various groups. For instance, if you take height 5 ft. 8 in., the maximum weight after making allowance of 25 per cent. would be as follows:

<i>Age Group</i>	<i>Maximum Weight</i>
20-24	194 lbs.
25-29	191 "
30-34	190 "
35-39	191 "
40-44	191 "
45-49	193 "
50-54	195 "
55-60	198 "

The uniformity in the above is very remarkable. In obtaining the maximum weight allowed for all ages, one only has to take the average of the maximum weights. Whilst it is quite true that the variations in the maximum weight for other heights would probably show less uniformity than for height 5 ft. 8 in., still the differences would not be at all serious.

After obtaining a table of maximum weights, one has only to make use of the weight unit as described by Mr. McKechnie in order to determine the number of years rating up for those over maximum weight. This method should commend itself on account of its simplicity, and the results are very close indeed to those produced by more elaborate methods. It is also, to a certain extent, elastic because if it is thought that 20 per cent. is not a fair allowance to make, then one can prepare a table assuming a 25 per cent. allowance. Again, if one

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should think that the weight units referred to by Mr. McKech-
nie are not satisfactory, then these units could be altered to
some slight extent. The method, then, commends itself on
account of its simplicity, its elasticity, and the good results
obtained.

Dr. McMahon—There were some points brought out by Dr.
Fisher which I think of a good deal of importance. In its
practical bearing I think this question of overweight gives the
Medical Director more trouble with agents and with appli-
cants for insurance than almost any other question. They are
constantly objecting that a big, strong, hearty-looking man is
rated for overweight, and they ask, is there not a difference
and a distinction to be drawn between the man who, it is true,
is large and heavy, but is yet very muscular and very active,
and the other man who is fat, flabby, and soft. It is difficult
to draw up any practical plan for meeting this objection. I
think, as a matter of fact, there is a difference in the caliber
of the two cases. I think that a man such as your Pennsyl-
vania Dutch, a large man, well muscled, with good longevity
in the family, can be treated more liberally than the fat, soft
man. When some attempt is made, however, to pick out the
good ones in the overweight class, we are met with the objec-
tion at once that if we take out the good ones and treat them
more liberally, then we must treat the bad ones more harshly,
and rate them higher. I think after all it is a question that is
not up to the medical man so much as it is to the Actuary, and
I feel like being guided by the Actuary to a very large extent
in the selection of the risks. I would suggest, however, that
something might be done along this line, to determine if there
is not a class of overweights that we can treat better than we
are doing at present.

I understand that some work is being done by a professor at
Cambridge, England, along this line. I have not been able to
obtain the details, but the point he brings out is this, that the
difference between a tall man and a short man is principally
in the length of his legs, and he would be inclined to look along
this direction for his results. He thinks that it does not make

so much difference about the height in proportion to the weight—that it is rather a question of surface area than of height and weight, and that this should be taken into consideration. In other words, he would be rather inclined to call in the surveyor than the measuring man! I do not know how much there is in this, but I hope to have more information on it shortly. A man in Toronto who is interested in the subject is looking it up. Unfortunately I was not able to get the details before coming here.

Dr. Symonds—I think in this discussion one element has been overlooked, and that is, the question of the medical examiner. The mortality of overweights is an increasing hazard, it increases not only with age but it increases with duration of policy, and one of the reasons why it increases with duration of policy is that the overweight generally dies of some degenerative disease which has been excluded by the examination. Now these figures that we have are all based upon the average examiner. He has performed his work in an average way, and he has excluded in an average way the presence of degenerative disease in the overweights which have been presented to him. If you take a first-class examiner, or a number of them, with a large number of cases examined by them you will get much better results, because they do it more accurately, they exclude the degenerative diseases more thoroughly, and you will therefore have a better line of risks, and I think that considerable importance should be attached to that in the selection of overweights.

There is another thing that Dr. McMahon mentioned, and which I have kept track of in my Company for a number of years, that the overweight with a long body, short-legged, is better than the average overweight. I hope we will have enough material to make a report on this class very soon, but we are fairly well satisfied that they are better risks of that type.

Mr. Gore—Dr. McMahon compared solid large-boned heavyweights with heavyweights who are flabby and soft, and I heard Dr. Symonds say under his breath—"The differ-

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ence is that the first are bad and the second are worse!" And I think our investigation showed that that comparison is true. The solid overweight men are really bad, but not as bad of course as the flabby ones.

In regard to this subject, I must confess that I am a little bit disappointed in the turn the discussion has taken. The subject is, "What Shall We Do With Overweights?" and we have had a lot of very valuable information as to experience with overweights, but practically nothing as to how they should be treated. I am coming to feel that in spite of the very high hopes entertained by the Joint Committee of the Medical Directors' Association and the Actuarial Society, as to the results we would get from our study of overweights, practically we have not succeeded. It seems to me that very many of the companies are as far apart in their methods of handling overweights as they were before this last table was published.

A week or ten days ago I had a case before me on which our insurance committee had disagreed. It was the case of a farmer, 34 years of age, about 49 pounds overweight, and 6 feet tall. According to the table gotten out by the Actuarial Society, his mortality rating would be about 155 per cent. It so happened he had a very good family history, and, being a farmer and a man of good habits, our insurance committee had split upon the question whether they should mark him for a special or medium rating. Our special rating provides for 30 per cent extra mortality, and our medium about 60 per cent. His family history, occupation and habits were favorable enough for me to decide that he would go into the special rating class. About half an hour after that case had left my desk, the proof sheets of the paper on Numerical Ratings, by Dr. Rogers and Mr. Hunter, were handed to me, and in looking at the table it occurred to me that apparently they would have rated that man more favorably than we. I found that according to the New York Life table, his rating was 139 per cent., and also according to their method of rating, his family history and habits and so on would have brought him down below 125 per cent., so that that man who was offered a special

policy with us, with a special rating, would have gotten a standard policy with the New York Life!

We have all had experiences of that kind with other companies, but "What shall we do with Overweights?" I feel that there is still much work to be done along this line before consistent action on the part of the companies as a whole can be expected.

Mr. Wood—May I just add a word in further explanation? According to one of the speakers we do not seem to be adhering very closely to the main point of the subject, namely, obtaining *uniformity* in dealing with overweights. I may say that the table referred to by Mr. McKechnie is one that has been used by a number of Canadian companies. We in Canada have been endeavoring to secure more uniformity and I think that we are succeeding fairly well. The Canadian companies doing business in the United States have greater difficulty in dealing with these cases, because such companies find that a number of the American companies have lower ratings than those employed by the Canadian companies, or are not charging any extra premium at all. In this respect, therefore, perhaps the Canadian companies have been more successful than the companies whose head offices are in the United States, and the former companies are endeavoring also at the present time to secure greater uniformity in the case of other sub-standard risks.

Dr. Van Wagenen—There was a remark made by Dr. McMahon that an English professor reaches the conclusion that the superficial area of the heavyweight is really his serious impairment. It is well for us to consider in these heavyweights that the real burden falls upon the heart, the center of circulation, which has to supply all that material with the vital nourishing fluid. It is a fact that most of our heavyweights die either of diseases of the heart, the vessels or the kidneys, and this would point decidedly to the fact that the increased work thrown upon the heart by the amount of tissue it has to supply makes it the deciding factor in these heavyweights. The muscular man has a better heart than he who carries more

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fat and less muscle, but it is reasonable to conclude that the amount of avoirdupois to be supplied by that central organ is the real matter for consideration. I believe that a heavy weight is a bad risk simply because his heart is not able to supply so much tissue, his protoplasm is underfed, and the body cells tend to degeneration.

Mr. Nichols—One thought has occurred to me in listening to this discussion—the more you investigate, the more you analyze, the more you reduce your opportunity for insurance. All you have to do is to analyze a man's condition down far enough through your medical examiners and through your actuaries and you will eliminate the insurance business altogether! There is danger of doing just that thing. I have been a student all my life, not only of life but of all other branches of insurance. When fire insurance was first introduced in Philadelphia, they only knew of one class of risks. Finally, a green tree burned, and their little engines of that date were not able to play on the flames through the branches of the trees. Immediately they distinguished between risks that had green trees in front and those that had not. That was their first limitation. From that stage, fire insurance has gone on until, as the fire-underwriters will tell you, the determination of a fire insurance rate now is a matter rather of judgment than of actuarial figuring. I would suggest the possible danger to you gentlemen, in all these investigations, of pushing them too far.

Mr. Moir—I would like to call your attention to the first word of the next subject—“*If National Prohibition Becomes Effective what Shall Be Done with People who Give a Past History of Intemperance or Were Recently Connected with the Sale of Liquors?*” I do not know why the committee selected “if” instead of “when,” but there it stands. Dr. Beckett will open the discussion.

Dr. Beckett—I did not know that I was to discuss this subject until I was just leaving my office for the East. I supposed there would be a paper read and that I was to follow in the discussion of the paper. I was not apprised to the contrary until I came into the building to-day. I have been so busy since I left the Home Office that I have had no time to prepare anything upon this subject. I do not like to apologize, but I feel that I must say this much to you.

I rather surmise the reason our President asked me to talk on this subject is because he thought our wine vineyards in California would be destroyed by prohibition. The fact of the matter is, wine grape growers have made more this year than ever before in the history of wine vineyards in California. The prices of wine grapes are very much higher this year than ever before. The "wets" were sure before we passed prohibition that the vineyards would be destroyed. In certain sections of our State the wine industry is important, but it seems to me that the "drys" have now a pretty good argument in favor of prohibition on the ground of the higher prices of grapes.

I presume the word "if" was put in the title of this subject, because we do not yet know whether or not national prohibition is going to be effective. It surely will not be effective on our Coast until the home supply is consumed, and the home supply with us is quite considerable.

I do not know what other companies will do, but the Pacific Mutual will go along in the same even tenor of its way, as it has done in the past. In my opinion there is a certain class of people who will drink more intoxicating liquors during the next two or three years, or until their home supply is exhausted, than they have before. My Company will not make any difference in the treatment of saloonkeepers or people who have been accustomed to drink to excess, for at least the next two or three years.

The drinking people throughout the country, who have had enough money to supply their cellars with enough to last for two or three years, have usually done so. Those who have not will doubtless find some way of getting liquor. Here in the

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East I presume they will manufacture hard cider, in the Middle West they will probably tap the silos, while in California prohibition will not be effective until the supply on hand becomes exhausted. I think if you would come out to our State, the usual hospitality of California would not be lessened for some time to come.

I believe that good will come to the insurance companies through this prohibition law. The accident companies will tell you that they already see a difference in their accidental losses. I know this to be the case with our Company. The great good, however, that is going to come to the insurance companies and to the people at large, is through the rising generation.

Mr. Linton—The Provident Life and Trust Company does not issue policies upon sub-standard lives, and the following remarks relate to the selection of risks under the standard policy forms issued at normal rates of premium.

An applicant who gives a history of having been a hard drinker will be accepted only if he has been an abstainer for four or five years. We shall move with particular caution in the case of the well-to-do applicant who states that he was in the habit of using liquor before prohibition days or who states in his application that he is still using it. A man of this character will very likely have a large stock of liquor on hand which will last for many years. Under prohibition the realization that he possesses a private stock of something that most other people do not have and which cannot be obtained elsewhere will produce a psychological effect that will tend at times to an abnormal desire for liquor. Moreover in drinking at home from his own private stock the larger quantity immediately available will in many instances lead to excess, whereas before the drought he would have been satisfied with a drink or two at the club. From this point of view it is likely that for several years national prohibition will introduce into the selection of risks a new hazard in connection with policies of large amounts. In the case of applicants who are reformed hard drinkers, or of applicants who have been, or at the time of application are,

moderate drinkers, the Inspection Report will have particular value. Especially in large cases will companies do well to have a thorough report on personal habits and on the source from which the applicant may be obtaining liquor for current use. In the case of many drinkers it is possible that some other habit, as the use of drugs or the excessive use of tobacco, will be developed to replace drinking, and we must be on our guard to detect cases where this substitution is taking place. There is also a danger that drinkers will indulge in an excessive use of candy and drinks containing a large amount of sugar, thereby increasing the hazard due to glycosuria and overweight. Still another possibility, particularly in the country districts, is the home preparation of alcoholic beverages. The present unusual demand for cider apples and wine grapes indicates the way the wind is blowing.

Where an applicant has been engaged in the sale or manufacture of liquor we will require that he shall have been engaged for at least two years in a new non-hazardous occupation. We shall also pay particular attention to the Inspection Report and shall scrutinize carefully the medical examination to discover any permanent effect of the former occupation. A similar careful scrutiny of the medical examination applies equally of course to those who show a past history of intemperance.

At present we have the following five "liquor" questions, in that part of our application which is filled in by the agent:

To what extent and in what form does he use alcoholic or other stimulants?

If a total abstainer, for how long has he been a total abstainer?

Is he at present or has he at any time been connected, directly or indirectly, with the manufacture or sale of wine, spirits or malt liquors?

If so, when and in what capacity?

Does he contemplate engaging in such occupation in the future?

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In addition to the foregoing questions we have five general occupation questions seeking information upon the present occupation, the length of time it has been followed, the nature of other occupations, the occupation during the past five years, any contemplated change of occupation.

In that part of the application which is filled in by the medical examiner, there are the following four questions relating to liquor:

What are his present habits as to use of wine, spirits, or malt liquors?

If he uses them regularly, state amount and form of daily consumption?

What are his past habits as to use of wine, spirits or malt liquors?

Has he ever used them to excess?

It is quite probable that within a year we shall considerably modify or perhaps remove entirely "liquor" questions from the agent's section of the application. From our experience the medical examiner, by reason of the longer time taken and the more searching character of his examination, is more likely to get at the exact facts as to the consumption of liquor than is the agent. To give us information as to possible connection in the past with the manufacture or sale of liquor, we shall probably rely upon the general questions relating to occupation.

Dr. Hall—There has always been a reluctance to accept habits cases from the earliest insurance days. This applies to the genuine abuses in alcohol clearly manifested in the papers as well as to those indicating a reform of longer or shorter duration. The direful consequences were probably exaggerated (as the result of prohibition propaganda), but it is pretty fairly certain there was justification for unfavorable action in any application indicating overindulgence even in mild degree, and also those indicating moderate users. Many of the milder forms of alcoholism must have crept into stand-

ard selection where such selection was not based upon a division into total abstainer class, and many were accepted as standard undoubtedly where a reform seemed more or less secure by reason of its duration. There appears to have been a tendency to center the objection to the reformed drinker on the facts as relating to the number of times the man got drunk and the duration of the overindulgences; whether or not he was a spreer of a week or more, or one whose intoxication would last for a few hours; the kind of drink consumed in these debauches, this to determine the amount of raw alcohol ingested, the time lapsing since overindulgence and the certainty with which the reformed condition could be depended upon. From this in consequence the events to expect and guard against if possible, in an individual giving a history of overindulgence and reform, were, 1st, the possibility of a relapse into habits of intemperance, and 2d, the danger of a permanent lesion as a result of his former excesses. Here often the latter possibility was somewhat slighted and put in the background or altogether overlooked apparently. This is evidenced by the nature of the inquiries made and the apparent higher mortality on reformed habits later indicated. We needed to be certain that a person had truly reformed of course, and by the time we had thrashed this out and perhaps settled once and for all in any fair minded person's mind that the applicant *had* reformed and was now an abstainer and the examination was negative as to any bad effects of his previous habits, we were faced by the question: Why is not this person a good risk because of his reform and has he not proven this true by the duration of the reformed period? We made careful inquiries as to when he reformed, how he reformed, and why he reformed. Whether by means of one of the so-called cures, or by will power alone, the thought being that if one depended on aid to help the reform there was more chance of a relapse upon removal of the aid. If the person had for a good and sufficient reason decided that he would give up liquor and had kept to this decision religiously for a considerable period, there was a stronger impression that he deserved more consideration than

one who had depended upon aid to bring about the reform, and a stronger appeal for him as a standard risk for insurance. There was another feature to consider. Is a person, strictly speaking, reformed, if he has stopped drinking to excess, but uses liquor in moderation? Those who believe there are no untoward effects in what they consider a moderate use of alcohol would say one who has been known to have had spreeing periods, or to have overindulged occasionally, but had entirely given up such habits and now only took a drink of wine or spirits with meals or on special occasions, would be inclined to class this person as reformed without cure, and in his rehabilitated condition he would be called a moderate user but with more chances of his relapsing. The excessive consumers are more often recruited from the moderate users than from the total abstainers, so this class, if we can class them, must be treated with more severity than the total abstainers after reform. We may be developing a new class or several new classes and our future inquiries must include the search for information as to whether or not our reformed total abstainers and moderate users have laid in a supply of liquor against the extreme drought, and thus be further subjected to the temptations of drink. We have, I think, been influenced too much by the thought that the danger was the relapsing into bad habits. We have depended upon the physical examination more than it deserved, in developing the bad effects of previous alcoholic excesses in our treatment of these reformed cases. There is extreme difficulty in determining the extent of such injury under our present requirements as to physical examinations. That there is some permanent bad effect, there seems to be no question of doubt, and those giving a history of intemperance, and even those in the extreme limit of moderate drinkers (so-called) may not manifest these bad effects by symptoms and signs for years. This is what must be guarded against as well as the danger of relapse. The obscurity of these physical changes may be illustrated by one theory alone. There is thought to be a cellular change brought about gradually under the destructive action of alcohol which

interferes with the replacement of the normal active constituent of the cells as under normal waste, and the substitution of connective tissue or fat. In other words the affected cells are rendered non-active and throw the work of an organ upon the normal cells remaining. The nerve cells appear to be the most vulnerable to this change, although for all we know, those of the blood vessels, the liver or kidneys, may be quite seriously impaired. The organs or nervous system may function in a perfectly normal manner for a long period of time under the handicap of a considerable portion of its cellular make-up thus destroyed or impaired, especially after the stimulus is withdrawn, but there is evidently a final stage where the remaining cells are unable to fulfil the whole function of the organ and the balance is tipped against it to the gradually lessened vitality of the whole system. The instances are numerous where a patient suffers from chronic kidney disease or an organic spinal or cerebral lesion which might be attributed to alcoholic excess in the past and which last for ten, fifteen, or twenty years after they have been discovered and diagnosed. We are unable to date the initial stage or the real onset of the disease with any accuracy. So it must be that many of the subjects passed upon as good risks because of the security we felt in the genuineness of the reformation and the length of time it lasted must have died as the result of the physical after-effects not discovered at the time of the application and examination. If this is true of the most favorable aspect of these habits cases, that is, that there is a probability of experiencing a higher mortality on them if accepted as standard risks, it must be true of those giving a history of reformation at a date nearer the application to a more marked extent because of the added danger of relapse. Even if we attempt to form classes and rate them in order to protect against all probabilities in the way of an extra mortality, there will always be the danger of over-penalizing the really good ones, and losing the business, leaving the bad ones in a class by themselves. This, however, seems the safest procedure. There is a measure of safety in having an impaired risk on the books at an increased premium

rather than to have an apparently good class giving an excess mortality. It is extremely difficult to classify these cases and to eliminate the personal in the selection. The information upon which we act is dependent so much upon speculation all along the line. Intemperance does not always imply the same consumption of liquor. Small quantities produce evidences of intoxication in one, while large quantities appear to be harmless to others. Whether a person drinks to excess or has drunk to excess is thus a matter of opinion. One stops drinking either when he himself thinks liquor is beginning to harm him, or when it interferes with his business, or for some other reason and decides that he won't drink as much or not at all, so even the reform becomes a matter of opinion. It is perhaps safer to say that anyone who has drunk to excess in sufficient quantities to make its effect apparent in any way and continued the practice for any appreciable length of time, and then discontinued its use, is not a standard risk at any time he applies for insurance. There is a plentiful supply of liquor still on hand. Many private accumulations and recently acquired stocks from which the steady free user may make demands, and it may well be that the reformed drinker thought it well to be prepared in case he should change his mind and will have the constant temptation still before him. We may not expect all our future applicants to be total abstainers. The difficulty in obtaining exact and truthful information will remain and probably be more difficult to secure under prohibition. The development of the lonesome drinker, the need for concealment of the knowledge that liquor is in his possession, the increase in the drinkers of substitutes, and the drinkers of home-made alcoholic beverages, those who turn to drugs for relief, all lead to the conclusion that no more liberality can be extended to an applicant giving a history of overindulgence because of the prohibition law.

Mr. Morris—The subject allotted assumes that national prohibition will become effective. While the discussion today does not necessarily involve this point, a brief consideration of this question may be of interest. The national prohibi-

tion law as amended permits the manufacture of light wines and cider for one's own use in his house. I was talking the other day with an Americanized Italian—a barber, to give the whole story—and was surprised to learn that he had expended some \$200 for grapes which he had crushed out the Sunday before and had made nearly two hundred gallons of wine of various strengths. The making of native wine, it appeared, is not particularly difficult although it requires knowledge and care in its treatment and ageing, and considerable labor. He figured that the wine, exclusive of labor, would cost him about \$.90 a gallon. It probably could be sold, were it salable, at about \$4.00 a gallon. I was further surprised to learn the number of carloads of grapes which had come into Hartford. It is very evident that there is more wine making amongst our foreign population than many of us realize.

My Italian friend, furthermore, was perfectly willing at a price to give me the benefit of his knowledge, that is, to come to my house with the necessary materials and presses and to manufacture for me in my house all the wine that I might desire at a cost of not greatly over \$1.00 a gallon. In other words, I could obtain good wine at a rate considerably under the cost before prohibition had even been nationally suggested and all this, as I understand it, entirely within the prohibition laws of the nation and my native state. It would appear, therefore, that the prohibition amendments may increase the number of wine makers.

We are all of us in New England familiar with the increase in the value of cider apples. Apples which heretofore have been allowed to rot on the ground are selling at a minimum of \$.50 a bushel.

While prohibition will undoubtedly eliminate the saloon and the hotel bar, it will not necessarily do away with intoxicants, although the nature and class of intoxicants will undoubtedly change. It is extremely difficult, therefore, to put one's self in a position to judge what should be done with applicants for insurance who give a past history of intemperance. Personally, I believe that the underwriter should main-

tain his rules as to the treatment of such cases for some time to come and at least until we can determine what prohibition means.

Persons recently engaged in the liquor business.

From a life insurance point of view this class involves two elements—first, the special risk of accident because of the class with which he deals, and second, the question of habits. If the saloon is discontinued, the bartender becomes thereby a somewhat better accident risk. What prohibition may involve as to a change in habits is, I believe, at this time problematical. A person who has any capital in the liquor business may easily reserve for himself a supply that will last for years. It has been the observation of all of us, I think, that since the first of July men with well provisioned cellars or other stocks have been more intemperate than was formerly the case. In some sections intemperance seems to show a tendency to increase, due to existing stocks. This, however, may be a temporary condition and it may disappear with the exhausting of stocks of hard liquor.

The underwriter in dealing with an applicant recently connected with the sale of liquor is probably justified in reducing the rating that was formerly charged on risks engaged in this business, but a sufficient rating should be maintained to cover the mortality associated with heavy drinkers. In the Company with which I am associated the general rule as to new business is to approximately split the difference in the former rating, with the understanding that at the end of a certain period, approximately three years, and upon receipt of satisfactory evidence of insurability the rating may be removed at the discretion of the Company provided, of course, the applicant's habits and then occupation are satisfactory.

On existing business the Company will not remove the extra rating for this hazard until after one year has elapsed since the change of occupation and will do so then only provided the present occupation is satisfactory and promises continuance and provided a medical examination will indicate that there is no impairment existing due to former habits.

It is well known that the free use of alcohol may produce a permanent effect upon the individual. The free user of alcohol who becomes an abstainer, maybe through necessity, is not as good a risk as the man who has always been an abstainer, although he undoubtedly will be a better risk than were the free use of alcohol continued.

Prohibition may mean, therefore, an improvement in the future health and mortality of our children. There is a serious question as to how much improvement may be expected in men of 45 or more at the present time who have in the past been free users of alcohol.

Mr. Nichols—Mr. Chairman and President: I have laid before the Society in the form of a leaflet what I have to say practically on this subject, and that leaflet is for distribution at the close of the meeting. I won't enlarge on that point, more than to call your attention to what I consider the abuse of statistics in the interest of the prohibitionists. I hold in my hand here a little Sunday School pamphlet which I picked up a few days ago, and it is apparently a mass of inane misstatements with regard to the effect of liquor, those statistics being drawn from the usual source of such statistics, and stating facts with regard to the mortality in connection with those who are drinking and in connection with those who are on the prohibition side, of course contrasting the two, but ignoring the fact as all that class of statistics do ignore the fact, that they represent in a very crude and rough manner two classes of our population, our clergy who are large representatives of our insured members, our leading lawyers and other professional men, also largely represented in insurance, are either abstainers or, as a rule, moderate drinkers, while the mechanics and the laboring men are the heavy drinkers. And there is also the notorious fact that the long livers are the farmers, the clergy, and the professional men, while the short livers are the mechanics and the laboring men, not by virtue of their habits with regard to liquor, but because of their occupations mainly and it is the confounding of these two elements that I regard as an abuse of statistics. And in that same pamphlet appears

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another amendment from these same prohibition parties in the interest of Sunday School children, urging that the next step be the exclusion of tobacco. Now along that line and along the line of liquor as well, I confess that I myself have been a moderate user of alcoholic liquor all my life. At the same time I have been a good citizen, and I have personally and individually closed saloons as public nuisances where the public themselves seemed to be unable to act.

You gentlemen seem to assume that this prohibition amendment is final. I am surprised that the lawyers involved in this matter have not seen, or at least have not brought forward before the public, the question as to the validity of this constitutional amendment. Our State of New Jersey, of which I am a citizen, has as you know repudiated it. You gentlemen are familiar with our constitutional history. You know that when our Constitution was framed the individual colonies surrendered only what was granted in that Constitution. All that was not surrendered by those colonies they retained as individual States, and retained to that extent their sovereignty. Now the vital question in that whole subject is, as to whether New Jersey, for instance, who repudiated that amendment, has authorized our general government to interfere with her domestic economy. Our fathers were in the habit of using liquor, and so were the founders of Newark, of whom I am the representative, our Puritan clergy. That town was founded by Puritan ancestors and Puritan clergy, and those Puritan ancestors were notorious for their fondness for good liquor. I am surprised that the lawyers have not gotten hold of the question, What power has the general government to compel New Jersey to surrender to its control her domestic economies? If they can compel New Jersey to do that, why cannot a sufficient majority of the States compel her to surrender her right to the use of tobacco, why cannot a sufficient majority of the States compel her to alter her territorial boundaries, her form of government, and even to establish a despotism? I will not go further along this line, but I simply call your attention to the matter. I am holding back the publication of an editorial

in one of our leading newspapers on this very point, in a neighboring large city, for fear of its effect on the political voting at the present time, but I expect to fire my gun very shortly.

Dr. Van Wagenen—The real question is, how we are going to treat in an insurance way, men who have used liquor to excess or who have been in the liquor trade. Now is not the gist, the kernel, of this whole matter, not the fact that these men have used liquor, but that they have a nervous system which calls for alcohol? Alcohol is simply the most convenient and least disagreeable of the stimulant narcotics. Any of us older men who practiced medicine years before we became medical directors will remember that men who drank heavily or who used stimulant narcotics came of very neurotic families. The trouble with these men is, not that they drink alcohol but that they must have *some* stimulant narcotic; and we will recall that men who reformed from alcohol usually took up some *other* stimulant narcotic, perhaps less damaging than alcohol, but still not entirely innocent; that they either drank very strong coffee or tea, which is the most innocent, or they smoked very heavy cigars, and a great many of them drank some alcohol still, indulging in tincture of ginger or compound extract of calisaya, flattering themselves they were not using alcohol, but that they were only taking ginger and calisaya. All this simply to answer the call of that appealing nervous system.

In considering men who have used alcohol to excess, the Mutual Benefit requires about five years of prohibition. We do not believe that such a man has been relieved from his inherited sensitive nervous system, but that if he has been a non-user of alcohol for that length of time he has proved he has some control over this appetite. However, let us look very carefully into the question whether he is not still doing some other thing that will make him just as much a poor risk as though he *were* using alcohol.

Mr. Moir—We have not had a great deal of discussion about the real subject, as to how we shall treat these cases. The last

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speaker, Dr. Van Wagenen, went into the subject, as did Mr. Linton, but on the whole I think a good many of those who pass upon risks would like to hear more about what companies are proposing to do along this line. We are not just discussing prohibition, however interesting it may be to all of us, but rather what we are going to do in the future with regard to it.

Dr. Turner—I would like to say that we in North Carolina have had prohibition sectionally, by counties, and for the last five years as a whole State we have been dry.

We believe in prohibition because we know that it does a lot of good in keeping whiskey out of the sight of the rising generation and the casual dram drinker.

But speaking to the subject, "What are we going to do when the whole country goes dry, with men who have been drinkers?" It is our opinion from an experience of five years that we cannot do anything more than we did before. Our reasons for this opinion are as follows:

As soon as prohibition is in vogue, immediately the price of the blind tiger whiskey rises from 75 cents a quart to \$5.00 and \$8.00 a quart, which large profit is the incentive for increased numbers to take the risk of making the moonshine whiskey, some of whom will make inferior grades of whiskey, in order still further to increase their profits.

Possibly some of you gentlemen do not realize that good whiskey cannot be made in a hurry. There is a reason for this. Fermented mash must be boiled at a certain low temperature in order to keep out fusel oil. If you boil it at too high a degree of heat you get the fusel oil, a deadly poison, along with the whiskey. The fellow in the bush is in a hurry to make this blind tiger whiskey and move the still before the officers can find his location. The result is that he may run his temperature too high and by so doing get a whiskey with fusel oil in it. Not only this fact, but in the mountains and in the lowlands as well, they are making their whiskey from molasses. This is called "monkey rum." They do this in order to get the fermentation quicker, so that the revenue officers and

the county officers will not have time to find where their fermenting tubs are located.

With five years' experience with prohibition, while we believe and we know that it is doing a lot of good among the rising generation and the casual dram drinkers, yet it is our opinion that the toper and the free drinker of bar-room days will continue to get alcoholics of some nature which, in our opinion, will render them worse risks from a life insurance standpoint than when they could get a purer article to satiate their alcoholic desires.

Mr. Rhodes—Supplementing what Dr. Van Wagenen said, the course which the Mutual Benefit will take may be very briefly stated. So far as the medical question is involved, we shall continue to go on just as we have. There is no reason why we should change our course in that respect.

So far as the occupational question is concerned, we are ready to consider a man who has been a saloon keeper and is now engaged in an unobjectionable occupation, provided the risk is otherwise good.

Dr. Toulmin—I should like to bring out one point, and that is the possibility of giving too much importance to two or three or more years of total abstinence and losing sight of the habits of the individual prior to that time. I have no doubt many of us have a tendency to draw the conclusion that if the individual has been a total abstainer, you can more or less lose sight of his previous habits. I think we should put it the other way and lay the greatest importance on the man's previous habits, because an ultimate high mortality will undoubtedly be found as the result of those habits, notwithstanding the fact that there may be years of total abstinence. Of course the man who has become a total abstainer is a better risk than the one who never did stop drinking, but I have likened the situation very much to the class of syphilitics. A man has had syphilis; he has had thorough treatment; you cannot find to-day any evidence of that disease, but you know that you are going to have a very high mortality with that class. So it is with those who have used alcohol to excess. You should ascertain the

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extent to which they have used it, how often to the point of intoxication, over how long a period of years, the habit between the periods of excess—and lay less stress on the question of a few years of total abstinence preceding the time of making application. The one question about which to be positive is—Have the habits of the applicant been such as to shorten his life expectancy?

Mr. Watt—There is just one point I would like to make with regard to the past use of alcohol, where the applicant has reformed and is now a total abstainer. In many such cases, according to my observation, abstinence from the use of liquor is due more or less to will power. At the present time, with the probability of the source of supply of liquor being eliminated entirely, and knowing that within a short time they will never again in all probability be able to get liquor, they are prone to take advantage of the short time that is left, and revert to their former habits, and if they do not get a grade of liquor that is high class they are apt to do themselves great injury. I knew of such a case recently, a man who had reformed for ten years, a good citizen, he thought he was getting his last chance to take liquor and he took a glass, or perhaps two, and in twenty-four hours he was dead. I believe the point is worth considering.

Mr. Marshall—There will be a tendency when the nation goes dry, for some agents to go to men formerly in the liquor business and resubmit their applications for insurance in the hope that they will obtain more favorable treatment as new entrants. If the bars are let down unduly, may we not look for an influx of such business?

Of course the question of the effect of prohibition is not entirely new. A number of states have already gone dry, and the question of the treatment of an ex-liquor man has necessarily been raised before.

Just recently I saw two cases submitted from one of these states where both applicants formerly had been proprietors of saloons. These cases made me realize that you must pick and choose—you cannot say, rate them up, or take them all on a

certain rigid basis. One case was particularly good, passed a splendid medical examination, an abstainer I think, or very moderate in the use of alcohol, and his occupation was that of farmer. He had sold out his saloon immediately upon the State going dry and had bought a farm and was putting his whole energy into the development of that farm. In a case like that, it is pretty difficult, after a year or so has elapsed and the inspection and other features are of the best, to refuse a policy on a reasonable plan.

The other case, however, is the one to which I had particular reference, and I think we shall see a number of them, if the country goes dry and the dry law becomes effective. This applicant owned a saloon, and immediately upon the State going dry, transformed it miraculously, overnight, into a restaurant and soft drink establishment, under exactly the same environment, patronage, and general atmosphere, the only difference being that he sold Bevo instead of intoxicants and ran a lunch counter on the side. A case like that, it seems to me, should be rated just as severely as a liquor dealer for many years. There should be no discrimination at all, because the elements that tended to cause the extra mortality are probably still present.

Between the extremes represented by these two cases, it seems to me, we shall have to lean over backwards and continue to treat ex-liquor men as sub-standard for a number of years to come.

Mr. Moir—That question affects more particularly the companies that apply a rating. Companies that do not rate have a comparatively simple problem, whereas the companies that have been rating in the past will have many applications that existing ratings be removed because of the change of occupation. Comparatively little has been said on the subject of occupation yet. There seems to be a general unanimity of opinion as to how to treat those who have indulged too freely and that is probably the simpler problem of the two. The larger one deals with the question of occupations, both past and present, and what the lives insured propose to do in future;

as in the case of those who have been saloon or restaurant keepers. Meantime we are simply exercising a general supervision with the feeling that the time has not yet come for the removal of ratings. The time may come later when, if there is a complete and absolute change of occupation, such as a saloon keeper becoming a farmer and remaining a farmer for two or three years, we might consider changing his rating; but a saloon keeper who merely changes to a restaurant keeper, and under the same environment, is not entitled to reconsideration at present.

Mr. W. A. P. Wood—In the company with which I am connected, we have been considering a plan of dealing with those who had, prior to the time of the passing of prohibition, been engaged in the liquor business. The method is to charge our regular extra premiums as in the past, and insert a clause in the policies to the effect that if prohibition is still in force a refund will be made, at the end of each year, of the extra premiums collected, and if at the end of five years prohibition shall be still in force and effective, the extra premiums will be canceled altogether. In connection with this, it should be remembered, however, that this company in the past has accepted only the better class of liquor risks, and it was felt that the question of habits was not as important as though we had been accepting some of the less desirable risks engaged in the liquor industry.

The other question came up with regard to what we should do in the case of those policyholders who have been paying extra premiums in the past on account of being engaged in the liquor industry. We were of the opinion that if they would submit to a medical examination at the present time, and if this were satisfactory, we might insert a clause in their policies similar to that outlined above, that is, a clause which would provide for the refund of the extra premiums during five years, and a cancellation of the extra entirely at the end of five years if prohibition were still in force and effective.

Mr. Little—There is one point that has not been mentioned in this discussion that I think attention should be called to. While men who have in the past been intemperate may, in the

future, be unable to indulge in the matter of alcoholic stimulants, it must be remembered that they are still the same type of individuals as before, namely, the self-indulgent class with, for the most part, a poor measure of self-control. It is only natural, therefore, to suppose that this type to which most of the excessive drinkers belong will continue to follow their natural bent, and self-indulgence in other directions will doubtless be persisted in, with perhaps nearly as serious effects on their prospects of longevity as their indulgence in alcoholic stimulants.

We all know that in the past the experience on lives with a history of excessive drinking has been very unsatisfactory, either because the reformed habits which existed at the date of insurance were not maintained permanently, or because the previous excesses had lowered the physical resistance of the individual.

To put the matter in another way, we might regard the history of excessive drinking not merely as indicating that the individual life had been damaged by such excesses, but also as indicating that the applicant belonged to a class who, under any circumstances, would prove inferior risks for life insurance on account of their poor degree of self-control.

Mr. Gibb—In connection with the consideration of new applications for insurance, I think the companies will have to take a more or less conservative course for the reason that they have relied to a very considerable extent on inspection reports for information with regard to liquor habits, and it will be much more difficult in the future for the companies to get accurate information on this subject, particularly in the case of applicants who reside in large cities. With regard to the men who take out the larger policies, it was the habit of the inspectors to pick up their information from the gossip around the clubs or the more fashionable hotels and restaurants. The tendency will more often now be to drink at home rather than in public places and therefore, in cases of doubt as to habits, it would seem that the companies will have to make a more careful investigation than in the past. Possibly the

questions in the application might be changed to include the query as to whether an applicant intends to continue to use intoxicants in the future.

Mr. Moir—Mr. Rhodes referred to the question of what we would do with a restaurant keeper. In the past we have accepted restaurant keepers who are not selling liquors. We would therefore have no cause to make any change in that respect, the only point being that we would be rather strict in examining the surrounding circumstances and in seeing that the inspection report was satisfactory. My own viewpoint is that prohibition is never going to become quite effective, and that this question will really be a more serious one in the future than it is now, because of home manufacture. It is so simple and easy to make alcoholic liquor, as Dr. Turner has pointed out. Dr. Beckett has spoken of the high prices obtained in California for wine grapes. They have a process of drying the grapes, and can dry them and pack them in very small bulk without taking away any of their value for wine-making purposes; those dried grapes are being shipped all over the United States, and that is why they are getting high prices and will get them for wine grapes. They are grapes that have a peculiar value for wine-making purposes. This is going to be a difficult question for many years to come.

Dr. Symonds moved on behalf of the Association of Life Insurance Medical Directors that we tender a vote of thanks to the officers of the Equitable Life Assurance Society for their most courteous reception and their hospitable treatment of us yesterday, and that the Secretary of our Association convey this vote of thanks to them in writing; also that we express our appreciation of the endeavors of both our retiring President, Dr. T. H. Rockwell, and of the presiding officer to-day, Mr. Henry Moir, to have a successful meeting, which endeavors have succeeded most admirably.

The motion was seconded by Dr. Beckett and carried.

Mr. Moir—On behalf of the Actuaries I can say that we appreciate very much the opportunity of meeting our friends in the Association of Life Insurance Medical Directors. The interchange of ideas is good for all of us, the actuaries from the mathematical standpoint and the medical directors from the medical and perhaps the human nature standpoint. I think the feeling some of us actuaries have is that we are liable to forget human nature occasionally, which is such a large item in all the affairs of life, that we are apt to be too mathematical and too exact. We as actuaries certainly appreciate the opportunity of meeting the Medical Directors face to face.

On motion the meeting adjourned *sine die*.

The following paper read by Dr. George S. Strathy, at the dinner held by the Association of Life Insurance Medical Directors and the Actuarial Society of America, is incorporated into the *Proceedings* of the Association:

IMPAIRMENTS, ARISING AS A RESULT OF MILITARY SERVICE

BY GEORGE S. STRATHY, CANADA LIFE ASSURANCE CO.,
TORONTO, CANADA

Mr. Chairman and Gentlemen: I am sorry to disappoint you by substituting myself for Dr. Scadding who was to have spoken this evening. Unfortunately he was unable to attend this meeting and he asked me to take his place.

For nearly five years I have been doing no insurance work, having been on military service in Canada, England, and France. During that time I have had an opportunity of seeing all the conditions of military training and active service and I

have often thought over the insurance problems which would result. Throughout the war I have made notes on the various medical problems as they presented themselves, matters of physique, hygiene, disease, and prognosis. To give even an outline of the insurance problems arising in men who have been on military service would demand a long paper. In the few minutes allotted I shall attempt only to deal with the larger problems and in a very sketchy manner.

I realize that a paper read before a meeting of this sort should deal with diseases in a mathematical manner as far as possible. This I find it impossible to do as the time elapsed since the beginning of the war is so short from an insurance standpoint. Any remarks that I make or conclusions that I draw will therefore not be free from personal bias and short experience. I shall try to give an idea of what the war diseases were and from that I shall ask you to draw your own conclusions until more time elapses so that statistics will become available.

I shall attempt to describe the conditions in the order of their severity and therefore shall discuss venereal disease, nephritis, neuroses, tuberculosis, wounds, and gas poisoning in that order.

Venereal disease in military life is but little different from civil life but there are some special features of it worth mentioning. Firstly I think, it is more common. It affected a higher proportion of troops fighting far from home than it did those who on leave were able to visit their homes. The longer a man is on service the more likely he is to expose himself to infection. Among 5600 troops from various arms of the service who returned with me on the *Olympic* 6% had had gonorrhœa during service and 2% had had syphilis. On account of the close supervision of the troops there was very little chance of a man having venereal disease without being treated. Treatment for syphilis was very thorough. So thorough that a not infrequent complication of too vigorous treatment was jaundice due to atrophy of the liver from arsenic poisoning. I had 60 such cases under my care and eight of them were fatal.

Where recovery occurred it appeared to be complete and I do not think these patients are impaired as insurance risks more than ordinary treated syphilitics. I would suggest that where an applicant gives a history of jaundice syphilis should be excluded. Other forms of jaundice due to infectious agents associated with dysentery or spirochætosis icterohæmorrhagiæ were common amongst troops in Macedonia, Palestine, Mesopotamia and German East Africa. They were less common, but did occur in the Western European Front.

Epidemic nephritis was probably the most frequent serious disease of the war, influenza excluded. Between 20,000 and 25,000 cases occurred in the years 1915, 1916, and 1917 in the British Expeditionary Force in France. Exact figures for the whole war are not yet available. Nephritis is usually regarded as a very serious impairment, but epidemic nephritis is not nearly as serious a disease as the nephritis of civil life. The army figures show a mortality of about 1%. Officers were very rarely affected. The cause is unknown. The disease usually ran a short course and convalescence was rapid. Personally I saw nearly a thousand cases in various stages. In a very small percentage of cases the disease became chronic, relapses were not frequent. Our rule of treating applicants with a history of epidemic nephritis is to exclude them for two years after the attack. If the attack was short we then accept them at standard rates if they show a normal urine and blood pressure. Where the attack was a little more prolonged we do not take them until the urine has been normal for at least two years and we rate the mortality at 125%. If the disease ran a protracted course we demand a longer interval before accepting at an increased rate. It may be of some interest to know that of 50,000 category "A" men at the base in France, not officers, 6.2% showed albumin in the urine, 2% of these were due to urethritis, cystitis, or spermatorrhœa, 2% showed only a slight trace with no casts, while 2.2% showed a distinct trace of albumin and casts were present. Ten thousand category "A" men on recruitment in England showed almost identical percentages.

Epidemic nephritis is not the same disease as acute nephritis of civil practice. Anuria is less marked, oedema more transient, lung symptoms are more common. Postmortem findings show it is a proliferative endarteritis of the kidneys, lungs, and brain. Degeneration of kidney epithelium is markedly less than in ordinary nephritis.

War neuroses cover such a large field that it is hard to discuss them in a few lines. They usually indicate a nervous system below par. The impairment varies with the degree of resulting incapacity and the length and severity of the strain to which an applicant was exposed. Almost any man's nerves will give way if his exposure to shell fire and the strain of trench life was long continued. Concussion and physical injuries play almost no part in the causation of so-called "shell shock." It was the nervous strain which broke men down. The impairment must be judged by the severity of the symptoms and the circumstances which led to the nervous break-down. The nerves of the British Army at the end of 1917 and in 1918 were at breaking point. They had had three and a half years of war and the end was not in sight. Their casualties had been terrific. The strain of frequent attacks is very trying. Consequently neuroses referable to all the systems were very common. The circulatory system if affected led to a chain of symptoms called D. A. H. or Disordered Action of the Heart in the army nomenclature. Lewis and his workers called it "Effort Syndrome." In the American army I believe it was called neuro-circulatory asthenia. The symptoms somewhat resembled those of exophthalmic goiter, the direct cause being upset of the autonomic nervous system. The heart and vessels in these patients now show no evidence of disease.

Nervous indigestion with vomiting of food was very common and in many cases led to an erroneous diagnosis of gastritis. Many of these patients were invalided from the army for that reason. Their stomachs are now normal.

Enuresis was the next most common neurosis and was best treated by removing the patient from nerve racking surroundings and making him continue at duty. I do not think any

of these last three neuroses constitute at all a serious impairment.

Only when the medical statistics of the war are published will we be able to judge whether pulmonary tuberculosis was more common in the army than in civil life. Many old tuberculous patients went through severe strain without return of active disease. Many cases of tuberculosis developed in the army. Personally I feel that a man who stood the strain of very active service without developing tuberculosis is not likely to develop it in the future but this is only conjecture. Pleurisy with effusion was more common in the army than in civil life. The general opinion of experts on lung disease, expressed at a conference in France in 1918, was that pleurisy with effusion in the army was less commonly tuberculous than in civil life. A very high percentage returned to full duty and remained healthy for the rest of the war.

I must discuss the impairment, resulting from wounds, with very few words. We already have statistics covering the impairment resulting from loss of limbs, we soon shall have much larger statistics of this kind. Wounds of the chest without empyema following are apparently not a serious impairment. Where empyema followed, but the lung damage is not great, the impairment should be less than where empyema followed pneumonia, for tuberculosis is not an element. Large statistics from all armies seem to show that tuberculosis following gunshot wound of the lung is rare. Retained missiles in the lung have so far caused very little trouble. Should the lung become damaged from disease their presence will be an added danger.

Gunshot wounds of the abdomen are probably best estimated by the damage done to the abdominal organs and the subjective symptoms present at the time of examination.

Gunshot wounds of the head with fractured skull are impossible to estimate within three years. Where the missile penetrated the skull I believe the mortality will be so high as to make them uninsurable. Linear or slightly depressed fractures of the skull may not exclude a man from insurance but I think they should only be considered when they have been

free from symptoms for three years. Jacksonian epilepsy is an unfortunately frequent sequela.

Gas poisoning caused a great wastage in the armies especially in the last two years of the war. Chlorine, the first gas used, was probably the only one which led to permanent damage of the lungs. Fortunately it became too dangerous to those discharging it when artillery fire became heavy and its use was discontinued. Phosgene and mustard gas while the cause of many thousands of deaths very rarely causes any permanent damage if death does not follow inside of three weeks. In a large hospital in England there were only three deaths from gas in the year 1918. There is no evidence that gas poisoning predisposed those affected to tuberculosis nor that it stirred up latent tuberculous infections. The late symptoms so often referred to gas poisoning by the patients themselves were due purely to nervous exhaustion.

Trench fever, next to wounds, the greatest cause of wastage in the British army, is a louse borne fever of unknown cause, very similar to malaria and causing intermittent fever for several weeks or several years. It was the greatest unsolved medical problem of the war. No deaths resulted from it but pains in the shins and back often lasted for several months afterwards. Nervous depression and general debility were common sequelæ but it is apparently no impairment from an insurance standpoint.

I hope, Mr. Chairman, that these sketchy outlines are not too ambiguous. I fear I was too ambitious in taking such a large subject for so short a paper. In a few years I hope to listen to a statistical paper by some member of this Association which will throw more light on these problems.

The Association of Life Insurance Medical Directors and the Actuarial Society of America held a joint dinner on the evening of Thursday, October 23, 1919, at the Hotel Astor. Dr. T. H. Rockwell was the toastmaster. The following members of the

Association of Life Insurance Medical Directors were present:

John L. Adams, Edwin H. Allen, T. D. Archibald, W. Armstrong, A. W. Balch, A. W. Billing, W. W. Beckett, W. M. Bradshaw, C. R. Burr, C. D. Bennett, L. D. Chapin, T. C. Craig, C. L. Christiernin, E. A. Colton, John N. Coolidge, R. M. Daley, P. G. Drake, E. W. Dwight, O. M. Eakins, C. H. English, W. G. Exton, J. W. Fisher, Homer Gage, A. Graham, A. Geiringer, A. A. Griswold, F. L. Grosvenor, I. Haines, J. B. Hall, G. C. Hall, A. B. Hobbs, W. G. Hutchinson, C. B. Irwin, W. A. Jaquith, A. O. Jimenis, A. J. Johnson, R. J. Kissock, A. S. Knight, R. L. Lounsberry, H. A. Martelle, O. F. Maxon, G. L. Megargee, T. F. McMahon, C. N. McCloud, J. C. Medd, W. Muhlberg, J. B. Ogden, H. Old, M. I. Olsen, J. A. Patton, J. S. Phelps, J. E. Pollard, W. E. Porter, A. T. Post, J. T. Priestley, T. H. Rockwell, O. H. Rogers, E. K. Root, E. F. Russell, R. L. Rowley, H. B. Speer, S. B. Scholz, M. Snow, G. S. Strathy, H. Toulmin, J. P. Turner, G. A. Van Wagenen, W. R. Ward, W. P. Watson, C. H. Willitts, McLeod C. Wilson, W. H. Wehner, F. S. Weisse, C. D. Wheeler, F. L. Wells, F. C. Wells, C. F. S. Whitney, T. H. Willard.

Dr. H. H. Chown, formerly a member of the Association, also attended the dinner, and Dr. W. W. Quinlan was present as a guest of Dr. Porter.

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G. S. Winston, M.D.	New York, N. Y.
Albert Wood, M.D.	Worcester, Mass.
Joseph C. Young, M.D.	Newark, N. J.



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